

May 16, 1977

S. Frederick D'Ignazio III  
202 Barclay Road  
Chapel Hill, NC 27514

John E. Leonarz  
Associate Chairman  
Department of Computer Science  
University of North Carolina  
Chapel Hill, NC 27514

Dear Mr. Leonarz:

In response to your request, I have prepared a notebook which covers my recent work experience and training.

The notebook begins with an updated resume which summarizes my qualifications. Following the resume are sections which feature or describe specific positions I have held, my data processing background and objectives (as of 1975), my academic experience, data processing training courses, letters of commendation, and selected articles, papers, and reviews I have written.

Most recently, I have been Assistant Director of the SENIC Project, Department of Biostatistics. UNC-SENIC has approximately 40 full-time employees and several students. Its mission is to provide data management and statistical analysis support for a 500,000-record nation-wide survey of hospital-acquired infections. Its budget runs well over \$1 million annually.

Before becoming Assistant Director of SENIC I was head of the Computer Programming & Analysis Section, the largest single unit in the project. As Section Head I supervised a staff of 15 systems analysts and programmers and managed a computer budget amounting to \$260,000 per annum.

I will begin classes in the Department of Computer Science this fall as a full-time (3 courses per semester) student. I plan to remain a full-time student until I have achieved my primary objective, a Ph.D. in Computer Science. Currently my chief interests lie in the areas of microcomputers and information retrieval.

Thank you for your attention and consideration. Please let me know if you would like any additional information. I am looking forward to our next conversation.

Sincerely,

*S. Frederick D'Ignazio III*  
S. Frederick D'Ignazio III

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S. FREDERICK D'IGNAZIO III

ADDRESS

202 Barclay Road  
Chapel Hill, NC 27514  
919-929-4467

DATE OF BIRTH

6 January 1949

EDUCATION

B.A. Brown University (1970)  
M.A. Tufts University (1971 -- Specialized in Socio-Economic Planning)  
\*\*\*\* Washington College of Law, The American University (1971-1972 -- 2 semesters)  
\*\*\*\* Presently enrolled in MS/Ph.D. Program at UNC Computer Sciences Department

EMPLOYMENT

Marketing Representative/Analyst (Management Systems Corp. -- 4/73 to 10/73)  
Program Administrator/Consultant/Analyst (The INSTITUTE -- 8/71 to 1/74)  
Analyst/Programmer (Computer Sciences Corporation -- 1/74 to 2/76)  
Systems Analyst (SENIC Project, UNC Dept. of Biostatistics -- 3/76 to 7/77)

SYSTEMS EXPERIENCE

\*\*\*\*CODE: D = DESIGN A = ANALYSIS P = PROGRAMMING T = TRAINING DO = DOCUMENTATION  
M = MANAGEMENT/ADMINISTRATION

D	Computer-Based Community Information System (The INSTITUTE)
Mktg/A	Small business software packages (Management Systems Corp.)
A/P/Coord	Three-Day, tri-city administrative/planning teleprocessing exhibit (CSC)
A/P/T/D/DO	Lead Poisoning Prevention System (CSC - Wash DC Dept of Human Resources)
A/P/T/D/DO	National Bicentennial Communities System (CSC - Bicentennial Administration)
A/P/T/D/DO	Hospital Infection Monitoring System (CSC - Andersen 2000 Inc)
A/P/DO	Aerometric Emissions and Reporting System (CSC - EPA)
A/P/DO	Automated Proposal Pricing & Gaming System (CSC - Internal)
A/P/D/DO	Hospital Stratification Index System (UNC - SENIC)
A/D/M	Data Collection & Infection Diagnosis System (UNC - SENIC)
A/D/M	Preliminary Data Base Management System (UNC - SENIC)
A/D/M	Deliverable/Task Projection & Reporting System (UNC - SENIC)

TRAINING

Formal Courses: Computer Systems (1 semester); PL/I (1 semester); Data Management Laboratory (1 semester); IBM NIPS Data Base Management (100 hours); DOS (18 hours); Computer Architecture (8 hours); Introduction to the H6000 (18 hours); H6000 JCL (24 hours); File and Library Management (18 hours); Time-Sharing (8 hours); DML Data Base Management (24 hours); FORTRAN IV/V (24 hours); Calculus (2 semesters); Regression & Analysis of Variance (1 semester)

Informal Study: On-the-Job/Manual training in COBOL, BASIC, FORTRAN, PL/I, SAS76; statistics; GOSSIP (Generalized Operating System Information Processor)

Equipment Experience: Univac & IBM keypunch; interactive/demand processing on CSC's time-sharing network, UNCCC's CALL-OS, TUCC's TSO, H6080 time-sharing system; 100's of hours using mass-storage/peripheral devices including magnetic disk (CDC/Itel) devices, Data 100 card readers and bulk printers, Honeywell remote batch printers and VIP terminals, Printronic 300, and various conversational terminals including Datapoint 3300, TI (including tape cassette model), Hazeltine 2000 (using tape cassette, screen formatting, cursor addressing), ADM-3 & ADM-3A, DECWriter II, IBM 3767, Perry 9000; CPU's include IBM 360/75, 370 models 155 and 165, Honeywell 6080, Univac 1108/1110

NORTH CAROLINA  
STATE PERSONNEL DEPARTMENT  
Position Description

(Leave Blank)

<p>1. Employee's Name      Last,      First,      Middle Initial</p> <p style="text-align: center;">D'IGNAZIO, SILVIO F.</p>	<p>4. Commission, Board, Department, or Institution</p> <p style="text-align: center;">UNC-CH Department of Biostatistics</p>
<p>2. Payroll Title</p> <p style="text-align: center;">Computer Systems Analyst III</p>	<p>5. Division, Section, or Unit</p> <p style="text-align: center;">S.E.N.I.C. Project</p>
<p>3. Usual Working Title of Position</p> <p style="text-align: center;">ASSISTANT DIRECTOR, SENIC Project</p>	<p>6. Place of Work or Headquarters (City, Building, Room or Other)</p> <p style="text-align: center;">314 W. Tower, NML Bldg., University Square</p>
<p>7. Name &amp; Title of your Immediate Supervisor</p> <p style="text-align: center;">Dr. Richard H. Shachtman, Director, SENIC Project</p>	
<p>8. Give the names and payroll titles of employees you supervise directly, if five or fewer. If you supervise more than five employees, give the number under each title. If you supervise one or more units, give the name of each unit and unit head and the number of employees in each unit by title. If you supervise no employees, write "none."</p>	

See attachment #1

9. Describe below in detail the work you do. Use your own words, and make your description so clear that persons unfamiliar with your work can understand exactly what you do. Indicate whether duties are regular, periodic or occasional. Indicate by percentage of time how your whole work day is used. If your work is of such a varied nature that it would be difficult to show an average day, consider the work of the entire year and estimate percentage of time spent on each task of which your job is composed. Total of all percentages should equal 100%. If necessary, attach additional sheets.

Time

## WORK PERFORMED

**PRIMARY RESPONSIBILITY:** To oversee the long-range planning and execution of the technical program required to successfully accomplish the goals spelled out in the contract with the Center for Disease Control. This involves interfacing with the Project Director, Dr. Richard H. Shachtman, as to the statistical requirements, negotiating with CDC as to time frames in which results are to be delivered, and determining the programming and data management effort required to deliver the service contracted for. Because of the high level of technical sophistication required, the complexities of the project mission, and the ever-changing demands emanating from CDC-Atlanta, a close liaison with the Administrative Section is mandatory. The Assistant Director therefore oversees the Administrative Section to ensure continuity within the project and to provide input to the Administrative Section Supervisor so that the work flow proceeds uninterrupted. Figure 1 indicates the way the Assistant Director participates in SENIC Project management: (see attachment #2)

D'Ignazio, Silvio F.  
PD-102 Attachment #1

Item #8:

1. Administrative Services Section  
Section Head: Myrna Bower (AA)

3 Secretary III's  
1 Accounting Technician  
1 Secretary IV

2. Data Base Administration Section  
Section Head: J. Woodward Claris (SRA I)

3. Data Management Section  
Section Head: Shirley Taylor (DP III)

6 Data Processor II's  
1 Clerk V  
2 Clerk II's  
7-10 Students

(prospective: 3 Clerk III's or Clerk IV's)

4. Computer Programming & Analysis Section  
Section Head: Ray Burns (CSA II)

2 Computer Programmer III's  
7 Computer Programmer II's  
4 Computer Programmer I's  
1 Data Processor III

/lsg

Figure 1. Management Functions of the SENIC Assistant Director

Management Function	Technical Time Requirement: 84%	Admin. Time Requirement: 16%	
Planning	25%	5%	Long term planning required to tie 4 segments of Project together. Involves programming, statistics, data management, and data base administration groups. Detailed, high level knowledge of most sophisticated programming techniques, and efficient handling of large volumes of data records are but two of the areas where the AD must be extremely knowledgeable. Works out master plans and detailed methodology.
Organization	4%	1%	Establish (with Director) formal structure of technical segments of project. Arrange, define, establish, and coordinate the Project subdivisions in order to produce defined results.
Staffing	1%	1%	Assist unit supervisors in establishing staffing tables and in selecting qualified employees. Assist Administrative Supervisor in adjudicating personnel problems.
Directing	35%	5%	The ever shifting requirements and ever changing programs established by CDC require a high level of "hands on" direction of technical units. Administrative unit direction is limited to establishing priorities on technical unit support needs and follow up on scheduling of results so that technical changes can be implemented.
Coordinating	8%	2%	General overview of Project progress involves coordination of technical unit effort. Changes in technical requirements result in shifting Administrative priorities - communicate to Administrative unit head.
Reporting	7%	1%	Primary reports go to Project Director and CDC. Also report administrative problems to Director for decision.
Budgeting	4%	1%	Primary responsibility for building budget rests with Administrative unit supervisor but budget requires very close coordination of effort between AD and Administrative unit supervisor.

Total: 100%

UNC-SENIC SUMMARY ORGANIZATION CHART

DR. RICHARD H. SHACHTMAN, DIRECTOR

JOHN SCHOENFELDER, GRA

DR. DANA QUADE  
Assoc. Director  
Head, Statistics  
Section

S. FREDERICK D'IGNAZIO  
Assistant Director  
CSA III

MYRNA BOWER

Head, Admin. Services  
Section  
AA I

RAY BURNS

Head, Computer  
Programming and  
Analysis Section  
CSA II

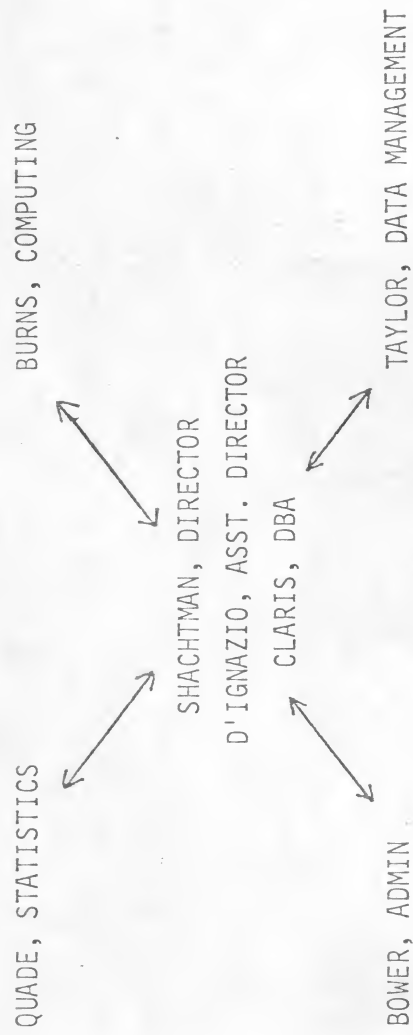
WOODY CLARIS

Head, Data Base  
Administration  
Section  
SRA I

SHIRLEY TAYLOR

Head, Data  
Management Group  
DP III

UNC-SENIC SUMMARY FUNCTION CHART



such strong community support that the mayor and town clerk number among its 20 recruits.

The Orange-Person-Chatham Mental Health Center, which is adapting the health facilitator concept to a preventive program in mental health and testing it in Cedar Grove, a small township in Orange County. In its infancy, the project has trained six interviewers who have canvassed 100 families to find out how they deal with their mental problems.

These self-help efforts demonstrate that the health facilitator concept can be applied to various settings, (urban or rural); age groups, (young or old); and topics, (diabetes, mental health, or heart disease).

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**The program has demonstrated that health facilitators do exist, that they can be identified in a number of ways, that many will volunteer for training, and that they will use this training to advise their clients.**

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#### What's Ahead

Funding for the health facilitator program, which began three years ago, expired in September 1976.

The facilitators, however, are continuing to do what they've been doing all along, only now they're "stronger than before and are more involved as leaders in their communities to get things done," said Dr. Salber.

Also, the program's staff members are preparing a manual and a video-tape which would distill what they've learned and teach others how to set up the program.

"We're trying to get further funding so we can attach the program to an ongoing ambulatory care facility. When this happens, the facilitators can report to the professionals in the clinic, 'This is what people need and want,' and the professionals can use the facilitators to diffuse information from the clinic to the community. Then there'll be a true partnership between providers and consumers," said Dr. Salber.

#### Lessons Learned

Although evaluation of the project is not complete, the program has demonstrated that health facilitators do exist, that they can be identified in a number of ways, that many will volunteer for training, and that they will use this training to advise their clients.

But how can this type of program be organized and diffused in this society? How can it be paid for?

"There's a lot of money for professional education but not for community health education," said Dr. Salber. "This despite the fact that every family has a primary care provider — the mother. Only a small proportion of people get health education now, and they're not always the right ones. The emphasis should be on educating the mothers and people outside the medical care system who can influence their families and fellow citizens towards healthier lifestyles."

Sister Jane Fell, coordinator of the Greenevers effort, echoes the thought: "It will be necessary for health professionals to acknowledge and make better use of other people in health care." Her own experience while working as a nurse in Afghanistan and Pakistan reinforces her belief. While there, she observed that after the doctor made his daily round, the patients would turn to the cleaning woman for advice! That's why she believes that a whole category of people ought to be brought into the health care delivery system and is currently helping to launch a health facilitator training program in her own community.

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**After the doctor made his daily round, the patients would turn to the cleaning woman for advice!**

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Through this and other health facilitator training programs, cadres of indigenous lay advisors can be formed to make people become more self-reliant when illness strikes, thereby reducing unnecessary health services utilization.

These health facilitators differ from outreach workers used in many service programs in this respect: "We don't impose an additional organization on to the community," said Dr. Salber. "We use people from the community and their network of contacts so there's no harm done to the community when the program's withdrawn. This is where the strength of the program lies."

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For further information, see the following:

Salber, Eva J.; Beery, William L.; Jackson, Ethel J. R.; "The Role of the Health Facilitator in Community Health Education," **Journal of Community Health**, Vol. 2, No. 1, (Fall 1976): pp. 5-20.

Salber, Eva J.; Greene, Sandra B.; Feldman, Jacob J.; and Hunter, Georgia: "Access to Health Care in a Southern Rural Community," **Medical Care**, Vol. 14, No. 12, (December 1976): pp. 971-986.

# SENIC Hospital~

When ex-President Richard Nixon checked into Long Beach Memorial Hospital in those waning days of 1974, he had been admitted for surgery on phlebitis. But while he was there, he contracted pneumonia — a hospital-acquired disease that frequently affects the bedridden and seriously ill. This and other post-operative complications nearly did him in . . .

Mr. Nixon's only one out of a million and a half people, or five per cent of all patients admitted to U.S. hospitals, who get hospital-acquired, or nosocomial, infections every year. The cost of these infections in extra days of hospitalization alone is \$1 billion (assuming that on the average they prolong each patient's hospital stay by a week at \$100 per day.) If other economic and psycho-social burdens resulting from lost work time, suffering, and death are added, the toll from nosocomial infections is staggering.

Because nosocomial infections contribute substantially to soaring hospital costs, the Center for Disease Control (CDC) in Atlanta, Ga., mounted an unprecedented national study in 1974 to examine whether infection control programs work and how hospital infections can be minimized. Known as The Study on the Efficacy of Nosocomial Infection Control (SENIC), the project is the largest and most sophisticated medical survey ever funded by CDC.

At the helm of the statistical design, data processing, and analysis for the study is Dr. Richard H. Shachtman, a research associate of the University of North Carolina's Health Services Research Center and Associate Professor in the UNC Department of Biostatistics. This department was chosen for the study because "it submitted the best proposal in the country," according to CDC Project Chief Dr. Robert Haley.

Essentially, the SENIC project consists of enumerating all the practices U.S. hospitals have adopted to abate nosocomial infections, estimating the prevalence of infections in these hospitals, and juxtaposing the two to determine which practices give the most prevention for the least cost.

#### Project's Genesis

The SENIC project is the culmination of a groundswell of interest in controlling

ATTACHMENTS TO PD-102  
S. Frederick D'Ignazio III  
October 8, 1976

# COMPUTER SCIENCES CORPORATION

## STAFF RESUME

S. FREDERICK D'IGNAZIO

Associate Member of Technical Staff

EDUCATION - MA in International Relations - specialty in quantitative policy analysis and comparative social and economic planning, Fletcher School of Law and Diplomacy, Tufts University (Massachusetts). BA (with honors) in International Relations - same specialty (thesis published), Brown University (Rhode Island).

SUMMARY - Mr. D'Ignazio has several years' experience in the area of community information management and social and economic development on a cross-national basis. He has lived in and done research in several Latin American Countries. He founded and was Executive Director of a nonprofit community development corporation for two years, and was Program Manager of a national bicentennial program to help communities develop advanced, computer-based planning and information management systems.

### PROFESSIONAL EXPERIENCE

Computer Sciences Corporation (since January 1974). Currently assigned to the development and operations department of the National Military Command System Support Center (NMCSSC) Support Contract. Responsible for NIPS-to-COBOL language conversion efforts as part of operations support system HIS 6000 work for NMCSSC. Current efforts also include programming and documentation of HIS 6000 Reconnaissance Information System.

The INSTITUTE (2-1/3 years). Co-founder and Executive Director. Responsibilities included coordinating and operating membership drive, drafting several technical papers and four proposals (contracts awarded for two), coordinating development of nationwide bicentennial program, local community goal setting and research projects, and development of technical and philosophical foundation of organization. Project work included intensive onlocation organizational liaison and coordination of public officials, local citizens, students, professors from local universities, business people, etc., for participation in the projects; also included design implementation of citizens' referendums/local and mass polls, videotape onlocation survey work. Work for 13-community program involved promotion of program, building of program credibility, legitimacy, etc. Also included position as principal investigator and supervision and coordination of eight member research team, which developed research and action models to improve community planning in smaller U.S. communities. As Executive Director of the Institute, work also included development of computerized information "resource banks" for institute client communities. Work involved design of data base and development of "key community" resources list, file creation and management, etc. As 33 teletype, tying in by Watts to Honeywell 6000 using basic language compiler was operated. System was taught to subordinates once it was set up. Work also involved the design and preliminary implementation of Community Early Warning Systems (CEWS), a set of citizen-run institutions constructed to anticipate and forecast future community crises and opportunities and then inform the community of their findings. CEWSs are based on a community ADP capability and employ community Social Indicators to create future profiles of the community using primarily quantitative data (through use of time series analysis/extrapolation, morphological, crossimpact matrices, delphi, and simulation).

Previous Related Experience. Published article entitled, "Applied Futurism! Information Technology." Wrote papers entitled, "Information Sharing (I and II)." Was Systems Analyst/consultant to management systems corporation of Bowie, Maryland. Responsibilities included marketing and promotion of Gossip software to small businesses and municipalities for use in file management and as a simplified management information system. Conducted Systems Analysis of information needs of potential clients and fit between those needs and Gossip capabilities. Data manager/editor/researcher consultant to planning and intergovernmental organizations. Created model of Brazilian socio-economic development (1700-Present).

## RESUME SUPPLEMENT

Fred D'Ignazio of CSC - Systems Division will be relocating in Chapel Hill, North Carolina in mid-June. In the fall of 1975 he will begin work (part-time) on his MS in Computer Science at the University of North Carolina Department of Computer Science.

Since coming to CSC in January 1974 most of Mr. D'Ignazio's programming and system development experience has been with INFONET - CSTS:

- In May 1974 Mr. D'Ignazio wrote several interactive BASIC programs on the BASIC subsystem of CSTS in order to give a talk and demonstration to several classes at the Lake Braddock High School, Fairfax, Virginia.
- In July 1974 Mr. D'Ignazio worked with INFONET - FGM)Rosslyn, INFONET -(Commercial)Philadelphia, and INFONET -(Commercial)Portland to set up a demonstration of a Bicentennial Communities network which linked the cities of Media, Pennsylvania, Bend, Oregon, and Wailuku, Hawaii from July 25-27 using DML programs Mr. D'Ignazio had written.
- In November 1974 Mr. D'Ignazio began work on-site at the D.C. Government Central Registry of the Lead Poisoning Prevention Program; since November Mr. D'Ignazio has handled all (DML) data base design, TI 733 (tape cassette) and keypunch data entry for the 5½ million character data base, written and implemented the online/batch update and maintenance subsystem, and automated the Federal Quarterly Report.
- In November 1974 Mr. D'Ignazio also began work on-site at the American Revolution Bicentennial Administration - Master Calendar Services Division; at ARBA/MCS Mr. D'Ignazio has used DML (and to a lesser extent COBOL and BASIC) to implement a Bicentennial Communities online update and periodic retrieval system; in addition to system development and coding responsibilities both at ARBA/MCS and D.C. Government, Mr. D'Ignazio had the responsibility of training several staff members in the use of system, in the fundamentals of DML and the GPS subsystem of CSTS.

(MORE)

- In June 1975 Mr. D'Ignazio began work at the North Carolina office of the Systems Division of Computer Sciences Corporation. At this time Mr. D'Ignazio was given the responsibility for the systems analysis and design of the Total Infection and Environmental Surveillance System (TIES) for an Atlanta air sampler manufacturer. Mr. D'Ignazio has completed the design and implementation of the TIES System, has written the entire TIES SOFTWARE documentation, and has set up a data entry subsystem using a Hazeltine 2000 tape cassette unit. Mr. D'Ignazio has journeyed to Atlanta twice to brief and train the customer in the use of the system and has written 23 of the 25 major programs for the system (update in COBOL, reports in ALADIN, utilities in ALADIN and FORTRAN).
- In November 1975 Mr. D'Ignazio began work on the Aerometric Emissions and Reporting System (AEROS - NEDS and SAROAD) for the Environmental Protection Agency's National Air Data Branch (NADB). Since November Mr. D'Ignazio has documented several COBOL and FORTRAN programs and has modified COBOL programs and system runstreams to conform to current NADB system usage and standards.

# COMPUTER SCIENCES CORPORATION

SYSTEMS DIVISION

(703) 533-8877

6565 ARLINGTON BOULEVARD • FALLS CHURCH, VIRGINIA 22046

To: Nick Robinson  
From: Fred D'Ignazio  
Re: Recent Contract Experience

In early November 1974 I began working on-site at the D. C. Government's Department of Human Resources on a Lead Poisoning Prevention System for the District of Columbia. Again using CSTS and DML (as in the Media, Pa. demonstration in July 1974), I designed and implemented a 5-million character data base (now expanded to 7.5 million characters), wrote batch and online editing, cross-referencing, update, and retrieval programs, and automated their quarterly report to the Federal Government. We did data entry using 3 Texas Instruments 733 (tape cassette) terminals and by punched card. I handled all data entry procedures, loaded the 17,000 cards we had punched by a private subcontractor. I did the data formatting, wrote the keypunch instructions, the error-checking, dump, and data base build programs, and data base reorganization programs. Currently, I am designing and coding a basic, client-tracking system to enable lead poisoning prevention program administrators to provide better and more immediate care for lead poisoning victims.

I am also working on-site at the American Revolution Bicentennial Administration in the Master Calendar Services Division. At ARBA/MCS I am again employing DML and some COBOL and BASIC to set up a data base, online data entry, editing, and retrieval programs, and a periodic reporting system for ARBA's Bicentennial Communities Program which involves some 3200 federally sponsored cities and towns nation-wide. In addition to my systems design and programming work (as at D. C. Government), I have trained Bicentennial Communities staff in DML programming and in the necessary procedures to operate the system. I am now designing similar systems for a Bicentennial Campus Program.

Question #24:  
EMPLOYMENT RECORD

Before going to work for Computer Sciences Corporation in January 1974, and after leaving the Fletcher School of Law and Diplomacy in June 1971:

- I attended American University Law School from September 1971 to June 1973. I did all right at law school but found that I definitely did not want to become a lawyer and eventually (June 1973) withdrew voluntarily from law school.
- While at law school and after leaving law school I was engaged in the following full or part-time activities:
  1. In August 1971 I co-founded The Institute (By-Laws adopted October 1972; incorporated November 1973; Tax-Exempt status granted by IRS in April 1974). The Institute is a small membership association (30 members currently) and research and community action firm which has engaged in projects aimed at improving citizen-official interaction in local communities and in improving the quality of local government management and planning. It has received grants (e.g., \$25,000 from NSF) totalling over \$33,000 and donations of services (notably \$10,000 in computer time) totalling another \$30,000. It publishes a quarterly magazine (Proteus) and is publishing a manual useful to small communities organizing community renewal activities around the Bicentennial. It has maintained projects in Media, Pa., Bend, Oregon, Wailuku, Hawaii, and Walpole, Massachusetts. I served for a year as Executive Director and am currently Chairman of the Board. Thanks to the generosity of my wife, all my work for The Institute has been on a volunteer basis.
  2. I served as a staff analyst/researcher for the ACIR (Advisory Commission on Inter-Governmental Relations) on a part-time (\$4.25 an hour basis) during January-May 1973.
  3. I worked for the American University Development Training Research Institute (DETRI) from August 1971 through March 1972 as a staff interviewer of AID-sponsored participants involved in work-study tours in the U.S. I left DETRI at the end of the current contract. While there I made \$4.25 an hour.
  4. I worked as Assistant Editor of the magazine The Futurist, a monthly published by the World Future Society, a non-profit organization of 20,000 members devoted to long-range planning. While at WFS (because of its continuing very tight budget) I worked partly for \$2.25/hour and partly on a volunteer basis.
  5. I worked for the Management Systems Corporation of Bowie Maryland as a systems analyst and marketing representative for their GOSSIP software package, an English-language processor useful to small businesses and local government to perform assorted data processing, data management, and record-keeping functions. I spent two months training on an MSC TTY but did not go further because the company decided to spend further time developing GOSSIP.

## DP BACKGROUND AND OBJECTIVES

### Academic Background

My interest in data processing and computer science began with my first exposure to the field as an undergraduate at Brown University. Unfortunately, I was already a senior at the time of my initial encounter with computers, or I would surely have selected compsci/aplmath as my major. As it was, I majored in international relations and have a strong background in French, Spanish, and Portuguese.

While at Brown I began quantitative research of U.S. foreign policy-making and Chinese-Latin American relations (see enclosed article). I used an IBM 360/30 computer located in Brown's Sociology Department to better structure my analysis and to perform some basic statistical tests such as the chi-square.

After leaving Brown I went to Rio de Janeiro on a research fellowship. I was offered a position the following summer at the Getulio Vargas Foundation in Rio as an instructor in computer science. Unhappily, I did not have enough money to pay my fare to and from the job.

From 1970-1971 I studied at the Fletcher School of Law and Diplomacy and earned an M.A. in international relations. While at Fletcher, I attended an introductory course in PL/I at Brown and wrote and ran some programs on the university's 360.

### Professional Background: The Institute

In the fall of 1971 I founded a non-profit social science and community planning firm called The Institute. Shortly thereafter I began working with Management Systems Corporation of Bowie, Maryland on a joint Institute-MSc project to develop a prototype automated community talent bank of planners and community affairs experts to be made available nation-wide to communities planning Bicentennial programs. We developed our data base on a TTY hooked into the Philco time-sharing system and used GOSSIP, an English language processor written in BASIC.

### Professional Background: Computer Sciences Corporation

I left The Institute in January 1974 and joined Computer Sciences Corporation. At CSC I learned COBOL on the Pentagon's Honeywell 6080 and wrote several COBOL report programs for the Office of the Joint Chiefs of Staff. Also, I wrote the users guide to a major military supply planning system.

In the spring of 1974 I wrote several, small interactive BASIC programs which I ran on CSC's time-sharing network (CSTS) at a demonstration I gave at a local area high school.

In July 1974 I rejoined The Institute to set up a unique, joint CSC-Institute-BINET (see below & see article) community information network. The "C3NET" was up for 3 days between Media, Pennsylvania, Bend, Oregon, and Wailuku, Hawaii and ran on CSC's time-sharing network under the sponsorship of the company's Infonet Division. A common data base was accessed by all three communities on Bicentennial, local government, and citizen affairs through the use of an online storage, questionnaire, and retrieval program I developed for the occasion. The C3NET was written in DML, a CSC data base management language written in FORTRAN.

In the fall of 1974 I began working on-site at the D.C. Government's Department of Human Resources on a Lead Poisoning Prevention System for the District of Columbia. Again using CSTS and DML, I designed and implemented a 4-million character data base (7,000 records), wrote batch and online editing, cross referencing, update, and retrieval programs, and automated their quarterly report to the Federal Government. We did data entry using 3 Texas Instruments 733 (tape cassette) terminals and by card. I handled all data entry procedures, loaded the 17,000 cards we had punched onto CSTS using a Data 100 card reader, did data formatting, wrote the keypunch instructions, the error-checking, dump, and data base build programs. Currently I am designing and coding a basic, client-tracking system to enable lead poisoning prevention administrators and inspectors to provide better and more immediate care for lead poisoning victims.

In addition, I am presently working on-site at the American Revolution Bicentennial Administration in the Master Calendar Services Division. There I have again used DML (and COBOL) to set up a data base, online data entry, editing and retrieval programs, and a periodic reporting system for ARBA's Bicentennial Communities Program which involves some 3000 federally sponsored cities and towns nation-wide. In addition to my systems design and programming work (as at D.C. Government) I have trained the Bicentennial Communities staff in DML programming and on how to operate and maintain the system. I am now designing similar systems for a Bicentennial Campus and a Bicentennial Military Bases Program.

### Training in Computer Science

Although I have a limited formal education in statistics and computer science I have extensive on-the-job, company training, and home study experience in these areas. I took a statistics seminar at Fletcher, have read several statistics texts, and now review computer science and statistics books for the American Association for the Advancement of Science.

At CSC I have learned and worked with ANSI (CODASYL + extensions) COBOL (with the HIS6000 Indexed Sequential Processor and with CSTS's Univac 1108). I attended 3 weeks of IBM NIPS (National Military Command Information Processing System) school and wrote several NIPS report programs and converted IBM NIPS programs on a Pentagon 360 to Honeywell COBOL on the 6000.

Beginning the spring of 1974 I have also taken the following evening courses at CSC: advanced statistics (8 hours), disk operating systems (18 hours), computer architecture (8 hours), introduction to the HIS6000 (18 hours), HIS6000 Job Control Language (24 hours), file and library management

(including time-sharing - 18 hours), FORTRAN IV/V (24 hours), and DML (24 hours + workshop).

### Equipment Background

I have used a recent model Univac keypunch and have extensive (program and drum card) experience on an IBM 029. In my work on CSC's time-sharing (Univac 1108) system I have had hundreds of hours of experience with magnetic drum, (CDC) multiple disk-drive mass storage devices, (7 & 9-track, 1600 bpi) magnetic tape units, Data 100 card readers and bulk printers. I have worked with a Honeywell (300 lpm) at the Pentagon. Also, I have worked with a wide variety of conversational terminals including the Datapoint 3300 (CRT), Teletype model 33 (impact), Honeywell VIP (CRT), Execuport (thermal), Hazeltine (CRT with printer), Sanders (intelligent CRT + hard copy printer), Anderson Jacobson (thermal), TI 730, 733 (tape cassette), and 735 units. By far, the majority of my work experience has been with time-sharing (interactive, and interactive generation of batch) processing rather than with complete batch processing.

### Goals and Objectives

I hope to work in public systems at the local government level, both in the U.S. and abroad. I am very interested in modelling, accounting, and in statistical analysis and hope to acquire the expertise in these areas to improve policy-making, record-keeping and the administration of public systems in programs I become involved in.

I am particularly interested in community information systems (see enclosures) which employ computers to enhance the delivery of social services at the local level, increase citizen-official interaction, and more effectively plug local communities into outside funding, knowledge, and power sources (such as Uncle Sam, state and county programs, and outside investors). I will be making a presentation on this subject this May at the annual Maryland Library Association Conference in Ocean City, Maryland.

# ACADEMIA: Grades and Experience

1966- 1970	Brown University Grade Point Average (B.A.) <sup>1</sup>	3.25 <sup>2</sup>
1969	Harvard University Summer School (Courses in Portuguese & International Politics)	
1970- 1971	Fletcher School of Law and Diplomacy, Tufts University, Grade Point Average (M.A.)	3.50
1970	Fellow of the Brazilian Institute of International Relations (IBRI)	
1970	Research Assistant to Dr. Gino Germani, Harvard Department of Sociology (included field work in Latin America)	
1971	Fellow of the Gulbenkian Foundation, Lisbon, Portugal	
1971- 1973	Washington College of Law, The American University (2 semesters)	
1971-	Reviewer, American Association for the Advancement of Science (AAAS) <sup>3</sup>	
1972- 1974	Speaker on Futurism and Information Technology	
1972	Article published in <u>Studies in Comparative Communism</u> (Spring 1972) <sup>3</sup>	
1973	Member of Center for Inter-American Relations Conference on Maoism in Latin America (meetings held periodically in New York City)	
1976	Paper published in Proceedings of ACM 14th Annual Southeastern Regional Conference	
1977	Paper published in Proceedings of ACM 15th Annual Southeastern Regional Conference	

## GRADUATE RECORD EXAMINATION

Aptitude Test (Verbal) 680  
Aptitude Test (Quantitative) 670

Working knowledge of Portuguese and Spanish; Superficial  
knowledge of French

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<sup>1</sup>Honors in International Relations

<sup>2</sup>See Section 7 -- I averaged 3.65 my last 2 years at Brown.

<sup>3</sup>See Section 10.

National Military Command System  
Support Center

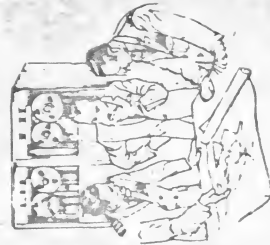
THIS CERTIFIES THAT

S. Frederick D'Ignazio

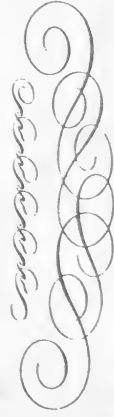
has successfully completed

NIPS 2 - Data Base Management with NIPS

this 5th day of April 1974



*J. C. Wilson*  
J. C. Wilson  
Captain, USN  
Commander



CSC  
COMPUTER SCIENCES CORPORATION

S. F. DeQuazio

---

*Has successfully completed the course*

ADVANCED STATISTICAL ANALYSIS

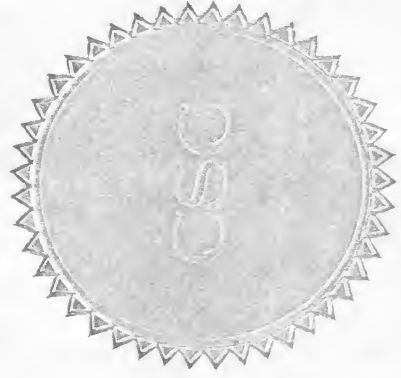
*and is awarded this certificate in recognition of personal effort  
toward the mastery of technical skills*

*April 1974*

---

*Youngman*  
MANAGEMENT DEVELOPMENT

*Allen*  
VICE PRESIDENT  
COMPUTER SCIENCES CORPORATION



# MEMORANDUM

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE  
PUBLIC HEALTH SERVICE  
CENTER FOR DISEASE CONTROL

TO : Fred D'Ignazio


DATE: April 20, 1977

THRU : Richard Shachtman, Ph.D.

FROM : Assistant to the Director  
Bacterial Diseases Division  
Bureau of Epidemiology

SUBJECT: Comments on the New Deliverable Tracking System

I reviewed the materials you sent regarding the new deliverables tracking system. As with all the new systems you have come up with, this one is absolutely brilliant. It satisfies a serious need and should save us many headaches in the future. Congratulations.

  
Robert W. Haley, M.D.

cc:

Mr. Tedesco  
Mr. Williams

American Revolution  
Bicentennial Administration  
736 Jackson Place N.W.  
Washington, D.C. 20276  
(202) 382-1776



May 23, 1975

Frederick P. Brooks, Jr.  
Chairman, Department of Computer Science  
213 New West  
Chapel Hill, N.C. 27514

Dear Dr. Brooks:

Sometime in the next few weeks a colleague of mine will enroll in your department as a graduate student. His name is S. Frederick D'Ignazio, and his prior academic record is extraordinary in quality and quantity. Fred is a doer, like yourself, and in the few years since he began his career in applied computer science, his progress and achievements have been outstanding. The purpose of this letter is to identify to you this person who possesses abundant quantities of motivation and ability to pursue excellence in his forthcoming graduate studies.

Under the guidance of your faculty Fred will, I'm sure, meet and surpass the high goals he has set for himself, and which you espouse. He comes to the University with my highest recommendation.

Sincerely,

A handwritten signature in dark ink, appearing to read "E.K. Zimmerman".

E.K. Zimmerman  
Director  
Master Calendar Services

# COMPUTER SCIENCES CORPORATION

SYSTEMS DIVISION

(703) 521-5280

400 ARMY NAVY DRIVE • ARLINGTON, VIRGINIA 22202

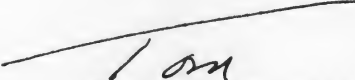
6 May 1975

TO: S. Fred D'Ignazio

SUBJECT: Letter of Appreciation

Attached for your records, is a copy of a letter from Mr. John J. Nolan in which he commends the technical services and assistance you provided to the American Revolution Bicentennial Administration.

I should like to add my commendation and thanks to you for a job well done. A technical ability and professional attitude such as you have displayed reflects highly on Computer Sciences Corporation. Your outstanding performance in this assignment has been a significant contribution to the continued success of CSC.

  
THOMAS M. WALKER  
Director  
NMCS Operation

TMW:dea

Attachment

April 24, 1975

Dean  
Graduate School  
University of North Carolina  
at Chapel Hill  
Chapel Hill, North Carolina 27514

Dear Sir:

This letter is written to express my personal appreciation and that of the Bureau of Preventive Services, Community Health and Hospitals Administration, Department of Human Resources, for the services rendered by Mr. Frederick S. D'Ignazio in our effort to establish a Central Lead Poisoning Registry.

The District of Columbia, through the Department of Human Resources, operates a Lead Poisoning Prevention Program. In early 1973, a Central Lead Poisoning Registry was introduced as a component of the program. The initial thrust was toward a manual system which was time consuming and involved massive amounts of data. The Central Lead Poisoning Registry became fully committed to an automated operation in November 1974 and has now had over two-thirds of the available data successfully entered into the ADP System. Much of the credit for this accomplishment goes to Mr. Frederick S. D'Ignazio of Computer Sciences Corporation.

Mr. D'Ignazio was assigned by Computer Sciences Corporation of Arlington, Virginia in October 1974 to the D.C. Lead Poisoning Prevention Program. His primary task was to establish and implement guidelines for a data base to support the Central Registry for Lead Poisoning. Mr. D'Ignazio, through diligence and unselfishness accomplished this mission in approximately six (6) months. In addition to his primary function, he willingly assumed the responsibility to train several staff members who had had no previous experience in data processing.

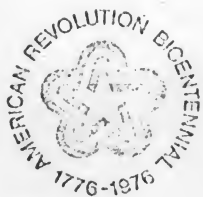
I recommend Mr. D'Ignazio to you without reservations and I am confident that he will be an asset to the Department of Computer Science at the University of North Carolina at Chapel Hill.

We will always be grateful for the contribution Mr. D'Ignazio made to the D.C. Lead Poisoning Prevention Program and wish him well in future endeavors.

Sincerely,

Sami A. Khoury, M.D., M.P.H.  
Chief, Bureau of Preventive  
Services

RT:cj:4/5



AMERICAN REVOLUTION BICENTENNIAL ADMINISTRATION

735 JACKSON PLACE, N.W.  
WASHINGTON, D.C. 20276  
(202) 302-1776

March 28, 1975

Mr. Nicholas Robinson  
C.S.C. Systems Division  
400 Army-Navy Drive  
Arlington, Virginia 22202

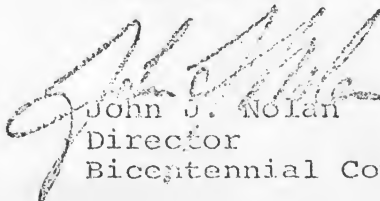
Dear Mr. Robinson:

I would like this letter to serve as an expression of appreciation and commendation to Mr. Fred D'Ignazio of your company for the technical services and assistance which he has provided this Division to date.

During the past three months Mr. D'Ignazio has worked closely with our Division's staff in the initiation of two computerized programs for the input and retrieval of basic data and the production of reports therefrom. He has made himself available not only during regular working hours but overtime on evenings and weekends as well.

I consider Mr. D'Ignazio an asset to and very competent representative of C.S.C. During the time of our relationship, his manner has been cordial, cooperative and professional.

Sincerely,



John J. Nolan  
Director

Bicentennial Communities Division

# City Planners Roll Up to See INFONET Demo at Media Fair

*Media, Pa* — Computer technology came to the Media Town Fair this year with government officials, city planners, and townspeople taking part in the demonstration of a unique three-city information and planning network.

The occasion was an experiment to develop new computer programs to help small cities improve their management and community planning capabilities.

The weekend demonstration was sponsored jointly by CSC's INFONET and Systems Divisions in cooperation with The Institute, a Washington-based non-profit organization that is developing a pioneering program for city government. The program, designated Century III, is designed to provide smaller communities within the U.S. with the tools, resources, and expertise they need to control their own future.

Media, along with Bend, Oregon and Wailuku, Hawaii - the two other cities linked in the demonstration network - are the first communities in the nation to participate in Century III. Eventually, the Century III Communities Program plans to link 13 small communities - modeled after the original thirteen American colonies - in a permanent data network.

As Systems Division programmer Fred

D'Ignazio points out, "The proposed data network will, in fact, represent a computerized version of the original Committees of Correspondence set up in March 1773 on the eve of the American Revolution. By providing the latest information gathering and handling tools, the communities participating in the program will have an opportunity to set their own goals, build consensus around them, and take realistic steps toward achieving them."

The joint INFONET/Systems Division exhibit served to illustrate some of the social, commercial, and governmental contributions that data processing can make at the local level.

Inside Media borough hall, a steady stream of fairgoers waited their turn to ask about their city via portable terminals. At the same time, similar queries were being made by officials and townspeople in Bend and Wailuku.

From data files stored in the INFONET computer center in Chicago, terminal operators retrieved information on municipal matters common to each of their communities. These included such categories as land use, resource management, business services and products, local service organizations, and proposed bicentennial activities.

D'Ignazio, who is a member of CSC's Information Sciences Center, is co-founder of The Institute and still serves as its part-time consultant. Through his efforts and the combined support of several CSC operations, the Media exhibit took place. The project was coordinated by Tom Walker, head of NMCSSC operations within the Information Sciences Center, and supported by INFONET personnel from the Philadelphia office and Federal Government marketing operation. In addition, Kathy Derr of Systems Division's social technology operations, provided program development support for the demonstration to the Delaware Valley representatives.

After documenting the results of the Media Town Fair demonstration, CSC plans to make a presentation of the findings, together with a blueprint for installing a pilot network and integrated municipal information system, to the National Science Foundation, chief funding agency for the Century III program.

## Bicentennial Events From Coast to Coast Catalogued by BINET

*Washington, D.C.* — Anything a visitor wants to know about this nation's bicentennial celebration plans from Anchorage, Alaska to Miami, Florida can be found in the Official Master Reference for Bicentennial Activities, thanks to the combined capabilities of BINET and INFONET.

Since its inauguration last summer, the Bicentennial Information Network — established by the American Revolution Bicentennial Administration to gather and disperse 200th anniversary celebration data from coast to coast — has catalogued over 2500 widely diversified projects and events.

According to BINET computer specialist Paul Brewster, the organization is responsible for collecting and storing information on all planned and operational activities in a master file maintained on INFONET. Operation of the network is handled by INFONET under its major contract with the General Services Administration. Brewster continues, "We're also using INFONET's data management language (DML) for the search programs but we're doing most of the writing ourselves."

Already hundreds of telephone requests for bicentennial information have been answered from on-line terminals in each of ARBA's ten regional offices. No spot in the continental U.S. is more than 600 miles away from a BINET access point.

The goal for 1974 is to set up terminals in all interested state commissions and to establish BINET as the nationally recognized information vehicle for bicentennial activities through 1977. Federal government agencies may access BINET through INFONET's National Teleprocessing Service, while private organizations may subscribe by applying to CSC for INFONET service and to ARBA for BINET programs and data base access.

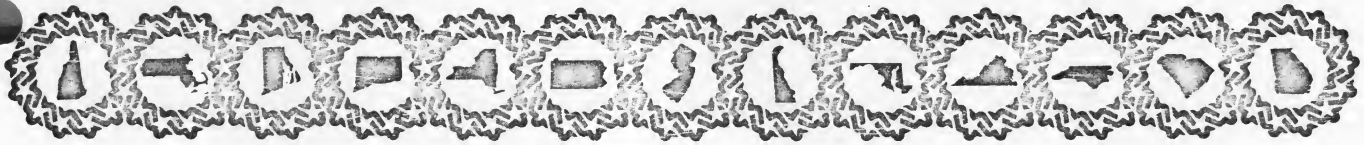
Among the first on-line terminal users is the U.S. Department of State. Typical private users are expected to be travel agencies, hotels, and restaurants.

According to BINET director Ed Zimmerman, all information in the master file is systematically classified by theme, geographic scope, subject, date, sponsorship information, and method of presentation. A comprehensive publications pro-



FRED D'IGNAZIO, left, with Mrs. Lynmar Brock and J. Warren Bullen, Jr., both members of the Delaware Valley Bicentennial Commission, at Media Town Fair

# News from the Thirteen Original States



## Century III Program Will Create New 1976-Style "Colonies"

The Institute, a Maryland-based non-profit corporation has as its goal the creation of 13 new "colonies," 1976-style, in 13 American communities. Some early phases of the Institute's Century III Communities Program (C3CP), as it's called, have been co-sponsored by the Bicentennial Council of the 13 Original States.

What the network of the 13 still-to-be-selected American communities will have in common with the 13 original colonies is that the communities will be small (under 25,000), separate, independent of one another to begin with, but united in a common aim of establishing long range goals for themselves, sharing experiences, and exchanging ideas and information.

The Institute does not plan to serve as a central government, or even necessarily take an active role in the solution of individual problem areas. Its role will be one of supplying information, suggesting possibilities, providing tools and structures and, hopefully, by computer, making the 13 separate areas accessible to one another.

A newsletter will report on ongoing community Bicentennial projects, conduct surveys, and offer profiles of projects emphasizing the "how-to" aspect. C3CP will also provide special reports and act as a kind of clearing house for the exchange of phone calls, tape cassettes, and visits.

Last July the Institute launched what could be called a test-run of the kind of program it wants to encourage in small communities. This project took place in Media, Pennsylvania in the form of a town fair and was sponsored by the Bicentennial Council of the Thirteen Original States, the Franklin Mint, and a National Science Foundation grant, with a computer provided by Computer Sciences Corporation of Maryland.

The Town Fair concept is integral to the Institute's plans in that it provides the kind of atmosphere in which support and enthusiasm run high. During the three days of happenings in Media, the community was connected by computer to Bend, Oregon, and later to

Wailuku, Hawaii in order to demonstrate how 13 modern "colonies" could exchange information.

In Media, more than 40 community service groups displayed how their organizations helped the community. The results, according to Arthur Gingrande, Program Coordinator of C3CP,

were encouraging. A community information center has been established in Media's library, as well as a community drop-in center designed for young people.

For further information, contact The Institute, Rock Hall, Box 174, RD1, Dickerson, Maryland 20753.

## Currier & Ives Exhibition is Scheduled

The proposed Travelers Insurance Company exhibit endorsed by the Bicentennial Council of the 13 Original States at its recent Tarrytown meeting (see last month's *USA-200*) will be called "The American Revolution as seen by Currier & Ives." Plans call for a moveable display of 20 Currier & Ives lithographs to be shown during 1975-76 in the 13 original states, and throughout the rest of the country after 1976.

The exhibit of these outstanding examples of 19th-century Americana, which were produced by the celebrated firm founded by Nathaniel Currier (1813-1888) and James M. Ives

(1824-1895), is tentatively scheduled to begin in Boston on June 17, 1975.

The exhibit will be linked to Travelers' ongoing Currier & Ives calendar series. For some years the insurance company has been producing calendars embellished with Currier & Ives prints for the kitchen, living room, and office walls of its customers.

The 1976 calendar will be devoted exclusively to the theme of the American Revolution. Twelve original lithographs used for the calendar months, plus approximately eight more, will be mounted in wood and clear plastic with the pictures recessed and lighted for best view.



CURRIER & IVES LITHOGRAPH, published in 1876, shows Washington taking command of the American army at Cambridge, Massachusetts, July 3, 1775.

PAPER ACCEPTED FOR PUBLICATION  
IN THE ASSOCIATION FOR COMPUTING  
MACHINERY, PROCEEDINGS OF THE  
15TH ANNUAL SOUTHEASTERN REGIONAL  
CONFERENCE, BILOXI, MISSISSIPPI,  
APRIL 18 - 20, 1977

THE SENIC PROJECT:  
Design Problems Associated with  
Data Acquisition for a Large-Scale  
Medical Data Base

S. Frederick D'Ignazio  
Assistant Director, SENIC Project  
University of North Carolina at Chapel Hill

ABSTRACT

The SENIC Project is a mammoth medical data management and statistical analysis study whose goal is to help hospitals around the U.S. minimize hospital-acquired infections. Data acquisition was begun in September 1975 and will continue into 1978. It will result in the accumulation of a set of raw data totalling almost 75 million characters and, eventually, in the formation of a medical data base of more than a quarter of a billion characters. This paper discusses design problems encountered as part of the data acquisition process.

INTRODUCTION

Dr. David Sencer, Director of the National Center for Disease Control (CDC) located in Atlanta, Georgia, in his appearance before the U.S. House of Representatives Appropriations Subcommittee in late February 1976 testified that infections acquired during hospital visits plague more than 1.6 million patients nation-wide at an annual cost of more than \$1 billion. CDC has deemed the problem of nosocomial (hospital-acquired) infection control to be of such major importance that it has begun a 5-year, multi-million dollar study to help hospitals across the country determine what can be done to minimize infections. This study, tagged SENIC (Study on the Efficacy of Nosocomial Infection Control), has included a mail survey of 6,500 hospitals to learn the level of commitment of U.S. hospitals to nosocomial infection surveillance and control, and an in-depth survey and computer-supported analysis of approximately half a million patient histories in some 350 hospitals around the country (see the map of SENIC Data Flow).

The SENIC Project was designed to include several pilot studies which precede the main, large-scale data acquisition and analysis effort. The pilots have served many purposes:

1. They have allowed experimentation with different types of data collection techniques and data collection personnel;

2. They have sparked a significant improvement in the quality of data collection forms;
3. They have been enormously instructive concerning the software needed to perform the data manipulation required to generate a large-scale medical data base; and
4. They have proved to be painfully enlightening in the area of scheduling, software development timetables, and programmer utilization.

While immersed in the pilot phase, SENIC Project designers at the University of North Carolina (UNC-SENIC) bumped into major design concerns and decision points every few weeks. These included:

1. Whether to execute the system on large, university-associated computers (IBM 360/370, mods 75,155,165, OS/MVT/HASP); or on a single contracting agency large computer (IBM 370/165) several hundred miles distant necessitating teleprocessing; or on a purchased or leased minicomputer installed in the local project office.
2. Whether to build a single, centrally located software development team employing one, major high-level language (PL/I, Optimizing Compiler) or contract out software development to several groups specializing in different languages.
3. Whether to use OCR (Optical Character Recognition), key-to-tape, or pure punched card technologies for data entry.
4. How to monitor the quality of data entry.
5. How to handle the problems of confidentiality, privacy, and data security for sensitive, hospital patient data.
6. How to maintain the statistical integrity of the data from forms acquisition through various steps of data manipulation.
7. How to tie together the efforts of a dispersed group of biostatisticians, epidemiologists, and computer programmers into concerted, integrated, and unified system development.

The original software believed sufficient to process the half million patient history forms consisted of a single, one-pass edit program. Today, the final project system which will be employed on the actual study data consists of 3 major subsystems, has taken more than 11 programmers in excess of 6 months to build, and bears a closer resemblance to a large computer operating system than to the original edit program.

This paper will trace the evolution of SENIC Project thinking and practices from the early edit program to the current system. It will attempt to summarize the intense educational process at work during the 20-month pilot phase of the project by highlighting the major design concerns and the major solutions devised by project designers.

#### HARDWARE

The UNC-SENIC software has been implemented on the Triangle Universities Computation Center (TUCC) facilities at Research Triangle Park, North Carolina. These facilities include 2 IBM System 370 model 165 computers (OS/MVT) with 4 million bytes of main storage.

In the fall of 1976 UNC-SENIC was advised by project officials at the Center for Disease Control (CDC-SENIC) that since SENIC was planning to spend anywhere from \$200,000 to \$800,000 at TUCC during the coming year, it should either: (a) get a special rate or (b) discontinue processing at TUCC and transfer all data processing activities to CDC's in-house computer, an IBM System 370 model 165.

The special rate which was discussed was to be computed by first dividing SENIC's total projected computer system utilization by maximum TUCC utilization. This would create a fraction which could be multiplied by TUCC's overall annual operating expenses plus expected earnings to give a special rate to the SENIC Project which would be commensurate with SENIC's utilization of the TUCC system.

Transferring data processing activities to the CDC computer appeared especially attractive because it was expected that the cost of processing would be far less than on TUCC's commercial system (even taking into account the academic discount enjoyed by SENIC).

The decision was finally made to continue processing at TUCC. An important justification for this decision was that the TUCC system was so valuable not because of its hardware facilities, but because of the wealth of software available. For example, the PL/I Optimizing and PL/I Checkout compilers, a TUCC-enhanced

version of IBM's Time Sharing Option (TSO), and the SAS76 Statistical Analysis Package were available at TUCC but not at CDC. Approximately 41 months of programmer time had already gone into development of SENIC systems using software supported by TUCC which was not supported by the CDC system. Obviously, a major conversion effort was required if the project planned to switch systems.

Among other justifications for the decision not to switch were:

1. Programmer retraining time and expense (almost all of UNC-SENIC's staff of 16 programmers and analysts had been hired because of their TUCC expertise and experience).
2. The long distance processing over commercial phone lines between Chapel Hill, North Carolina, and Atlanta, Georgia, could only be done if CDC acquired new telecommunications hardware which would have to be tested and incorporated into CDC's existing computer system.
3. CDC's system was largely a batch-oriented system which catered to very specific types of users within the Center; it would take a major effort to adapt the system and its operations procedures so that they could be highly responsive in a remote user, time sensitive, teleprocessing environment.
4. Most importantly, major software deadlines were close at hand for UNC-SENIC and would have to be postponed by several months if the switch to Atlanta were made.

#### SUBCONTRACTORS

Very early in the development of the project it was determined that the lone UNC-SENIC programmer could not develop needed software at the rapid pace required by SENIC Project deadlines. As a result of this decision, early edit, format conversion, and infection diagnosis programs were subcontracted to the UNC Computation Center (UNCCC).

By mid-1976 it was seen that it was necessary to develop one or more additional format conversion programs. Data collection forms had undergone frequent, substantial changes. Also, older versions of the edit, infection diagnosis, and quality control programs were now looked on as inadequate. New versions were underway which would only accept the current form as input. Finally, it was scientifically and politically imperative to

process the pilot data for research method validation analysis and to produce the reports promised to pilot hospitals. Since programmers at UNC-SENIC were already completely occupied, the decision was made to have CDC-SENIC develop the conversion program.

Shortly afterwards, CDC-SENIC discovered that the General Services Administration of the U.S. Government had a contract with a software development firm based in Huntsville, Alabama. CDC-SENIC officials encouraged UNC-SENIC officials to make use of this firm due to its extremely low rates. In August, 1976, efforts were begun to subcontract the data collection quality control sub-system to the Alabama firm.

Lastly, after the decision had been made to use key-to-tape processing for data entry, significant data reformatting tasks were subcontracted to the key-to-tape firm to perform using their minicomputer-based data entry system.

In all four of the above cases, subcontracting was eventually abandoned, or, if continued, produced programs which later had to be extensively modified or rewritten by UNC-SENIC programmers. It was woefully learned that with the incorporation of subcontractors into the software development process came an expensive overhead in the form of communication and control costs. This was especially true in the case of the subcontractors in Atlanta and Huntsville who were remote and who programmed in COBOL rather than in UNC-SENIC's standard languages, PL/I and SAS76.

The UNC-SENIC programming section was over-committed so it sought aid by subcontracting. And, since the section was over-committed, no time could be spent to direct the effort of the subcontractor. Consequently, the subcontractor's work slowed to a standstill, as in the case of the Huntsville firm (and, at times, UNCCC), or it went ahead swiftly in the wrong direction and generated a product that, at best, enjoyed only temporary usefulness.

There is one exception, however, to this situation. UNCCC has written 3 major edit programs for UNC-SENIC. Major deficiencies discovered in the first two programs caused them to be discarded. It appears that the third edit program, based on the lessons UNCCC learned from programs one and two, will be able to adequately handle the main influx of project data (400,000 forms from some 350 hospitals). The probable success of the third program is due in large part to its being the first subcontracted program to be closely and systematically monitored by a UNC-SENIC analyst/programmer whose primary function has been to deliver the program and the sub-system of which it is a part. Also, this is the first subcontracted program produced

from detailed specifications drawn up jointly by the SENIC Project Officer/Epidemiologist, UNC-SENIC computer technicians, and representatives of the subcontractor, UNCCC.

#### ADMINISTRATION OF DATA PROCESSING

UNC-SENIC data processing has been performed by 2 independent departments, a Data Management Group (S-DMG) and a Computer Programming & Analysis Section (S-CPA). Until recently, the heads of these two departments reported directly to the UNC-SENIC Project Director. Both the programming section and the data management group are further divided into teams by system, sub-system, or functional area. In S-CPA, teams are composed of an analyst/programmer team leader and one to three programmers. In S-DMG, teams are composed of a high-level data processor or clerk and several lower-level data processors and clerks. An Administrative Services Section and a Statistics Section complete the UNC-SENIC organizational picture.

Two major defects in the UNC-SENIC organization external to the programming section contributed significantly to a major weakness within the section. First, there was no Manager of Data Processing whose responsibility it was to administer and coordinate actions between the programming and data management departments. Heads of both these groups spent a significant amount of time trying to integrate their departments' activities. Unfortunately, much too frequently important software and data management matters were left unattended or, worse, slipped into the crack lying between the 2 groups' perceived sets of responsibilities.

Second, there was no Project Manager with responsibility for project business and administrative activities including equipment, space, furniture, and materiel acquisition, proposal writing, budget preparation, project accounting, and personnel management. In the absence of this individual, the data management and programming section heads were forced to spend much of their time justifying and acquiring resources needed by their groups instead of managing their groups' extremely complex technical activities.

The lack of administrative support coupled with the loss of close technical direction effected a transfer of many administrative responsibilities and several systems analysis functions to the team leaders. Consequently, the team leaders were obligated to spend a significant fraction of their time performing systems design functions and pleading for resources (including terminals, space, microfilm equipment, space, desks, and phones) for their team members. This mass competition for scarce resources came at a time when project promotion funds

were unusually depleted and when many items including terminals and desirable office space were in short supply. This situation produced personnel dissatisfaction, lack of unified systems design, and uncoordinated program development. No one emerged as an accessible source of current, project-wide technical information. Instead, everyone was either fully occupied pursuing administrative matters or engrossed in the development of their own particular portion of the overall system.

When the weaknesses above became fully and painfully apparent, project officials moved quickly to reorganize. The new position of Assistant Director was created to take on all major project administrative responsibilities and to coordinate and administer the joint effort of the data management and programming departments. It is hoped that the addition of the Assistant Director position will allow the programming and data management department heads to devote themselves exclusively to the technical management of their respective groups, and will relieve the team leaders of their administrative and systems design burdens.

#### PRIVACY AND CONFIDENTIALITY

Privacy and confidentiality of the data has been an important concern of both CDC-SENIC and UNC-SENIC project officials. Efforts have been made from the time of data collection on to protect the privacy of individual hospital patients and of individual hospitals throughout the entire data management and statistical analysis process.

Once patients have been randomly selected in a particular hospital and their charts reviewed, the list that links their chart I.D. with the form serial number on the data collection form is kept under lock and key in the individual hospital and is only available to certain project administrators.

Later, when forms arrive at UNC-SENIC, elaborate security precautions are taken. These precautions include locked forms rooms, double-lock work areas, special forms handling and monitoring by the data entry subcontractor, the shredding of old forms and computer listings, and the requirement that all UNC-SENIC employees and all visitors to UNC-SENIC secure work areas sign a confidentiality agreement.

#### DATA ENTRY CHOICES

The original choice for the bulk of data entry was Optical Character Recognition (OCR) processing. However, during the early phase of the project, certain portions of the data were

keypunched. The OCR equipment transferred the data from forms onto magnetic tape, while the keypunch equipment, of course, generated punched cards which were later copied onto tape.

OCR technology appealed to project officials due to its apparent speed, accuracy, and reasonable cost given the anticipated rapid influx over a period of only 5 or 6 months of 500,000 forms containing 85 million characters of data.

OCR technology became less desirable when it was learned that: (a) it necessitated careful (and expensive) training and monitoring of data collectors to make sure they recorded data in a manner acceptable to the OCR reader; and (b) even after having been trained and under careful supervision, data collectors were likely to pencil in many characters that stumped the reader or else caused it to misread the correct character and replace it with an incorrect character. Additional difficulties which plagued OCR processing in its early pilot stages included frequent equipment downtime and the mangling of forms by the reader. Also, the reader grossly misinterpreted forms during early processing due to inadequate forms packaging by data collector teams, the use of improper paper stock and printer's ink, misalignment of the forms during printing, and the inclusion of extraneous substances on the form such as data collectors' coffee stains.

Surprisingly, use of keypunch processing also resulted in substantial data errors due to inadequate or fluctuating specifications, to insufficient monitoring of the quality of keypunch output, and to the batching of the keypunch workload by card type rather than by form. This particular action, though it made the keypunching easier for the keypunch operators, made it impossible to correctly regroup forms when a card's key was mispunched.

The decision was finally made to have the bulk of project data entry done by key-to-tape equipment where a minicomputer was employed for an online edit of keyed data. This mode of data entry has proven to be competitive with the OCR mode since the density of characters per form sheet is not high. For example, the density of SENIC forms is approximately 50 characters per sheet, or 175 keystrokes spaced over the 10 - 15 cards which make up an average form.

Importantly, use of the key-to-tape mode of data entry has allowed for software control and manipulation of data as it is keyed in. As an example, data on sheet 2 of the form is entered horizontally from left to right across the page. With help from an edit program, the sheet is built as a matrix and is temporarily stored as a unit on disk. When the sheet has been completely entered, the program (written especially for this

application) inverts the matrix and writes the data to tape as card image records, column by column.

Guidelines which were assembled during experimentation with the various data entry modes include: (a) the need for careful drafting and negotiation of data entry specifications well before the outset of data entry; (b) the need for contractual agreements to bind the provider of data entry services to perform data entry below the project's maximum acceptable error rate, above the project's minimum acceptable speed of turnaround, and in line with the overall processing volume and processing completion requirements established by the project; and (c) the importance of developing several manual and automated techniques to verify the continuing accuracy of data entry in a prompt and consistent manner.

### THE SYSTEM DEVELOPMENT CYCLE

SENIC Project officials have experimented with various system development cycles. The one which has evolved which appears to be the most useful has the following stages: major program identification, system formulation, program functional specification, program technical specification, and program development, production & maintenance. This cycle is summarized below:

#### 1. Major Program Identification

The lead systems analyst, the project officer/epidemiologist, and the UNC-SENIC project director/biostatistician attempt to look far enough ahead to consider actions that will have to be taken on study data (under the general headings of forms handling, data entry, update and edit, security, auditing and quality control, data base management, analysis, and administration). Once these actions are identified, it is important to outline the types of programs the actions will entail. (Proposal writing provides an excellent opportunity to undergo the process of program identification.)

#### 2. System Formulation

After the programs have been isolated it is crucial for the systems analyst to link them into a cohesive system or sub-system. Then, once a system or sub-system has been formulated, it is equally as crucial for the analyst to draft a system specification and publicize it throughout the project. A unified conceptual image of the proposed system and a shared

working vocabulary which describes the system are the results of this stage if it is successful and undertaken early.

### 3. Program Functional Specification

The project officer/epidemiologist needs to draft his or her conception of the major functional attributes of particular programs which have been identified as part of stage one and synthesized into a system as part of stage two.

The timeliness and the completeness of the functional specification are prerequisites for the successful implementation of this stage and of later stages. Also, implementation of this stage presupposes the strategic and frequent availability of the project officer/epidemiologist. Furthermore, it appears there is a critical windowing phenomenon that characterizes this stage. The aperture may be narrow or wide depending upon project deadlines and the program being described. However, it is critical that the project officer/epidemiologist draft and communicate the functional specification of a program while the window is open. If the window is missed, lack of synchronism with related project activities produces a breakdown in the software development cycle and uncoordinated thrashing or frustrating inactivity in any program development efforts linked to this program and its system.

### 4. Program Technical Specification

The chief biostatistician receives the completed functional specifications from the project officer/epidemiologist. Working closely with analysts and programmers the biostatistician further fleshes out the program's functional specification and transforms it into a document which details major program algorithms, program input and program output requirements. The chief biostatistician conducts a structured walk-through of the program's technical specification for analysts and programmers.

This stage serves three important purposes. First, it converts the conceptual document prepared by the project officer/epidemiologist into a working recipe for a computer program. Second, it ensures that the program will produce the results anticipated by the project officer/epidemiologist and required for further project advancement. Third, it ensures that a

high level of statistical quality will be maintained in the inner workings of the program so as to protect the scientific authenticity of later analysis which hinges upon program output.

#### 5. Program Development, Production & Maintenance

The programmers receive the technical specification from the chief biostatistician and translate it into computer code. The programmers test the program, put it into production, document it, and maintain it. Modifications to the existing program may enter into the system development cycle anywhere from stage one to stage four.

#### THE SYSTEM: Edit

The SENIC Project began with a simple, one-step edit program a year ago. The current edit sub-system (see the Data Collection & Infection Diagnosis System flowchart, lower left hand quadrant) is the direct result of approximately 25 months of programmer, analyst, and project officer/epidemiologist development and the indirect outcome of a year's collective experience of 10 project participants.

The heart of the edit sub-system is the edit program which actually performs the editing function. It is surrounded, however, with several layers of software which support it and enable it to operate in an environment characterized by a disconcertingly high level of data volume and rate of data flow and by an unusually important need for processing and uptime reliability.

There are three major categories of software which together with the edit program make up the edit sub-system. First, there is software to read in the raw data on magnetic tape and recycled data on disk and sort it and massage it for input into the edit program. Second, there is the edit program itself which searches for range and consistency errors in the data. This search is guided by a flexible, variable edit parameter table which the edit program calls into core each time it is executed. The edit program automatically recodes a significant portion of the errors which it encounters. If no automatic recoding is possible, the form is pulled, directed into a bad forms file, and a record is written to an error report specifying the nature and location of the error. Third, there is the manual edit of bad forms and their subsequent insertion back into the queue of forms waiting to be cycled or recycled through the edit program. Finally, there is extensive forms tracking and queue management software which monitors and guides forms through the entire

edit/reedit process. This software is chiefly useful in minimizing the loss of forms in the system and in preventing overflow in the myriad tape and disk datasets employed by the system for temporary data storage.

#### THE SYSTEM: Quality Control

In a data collection effort of this magnitude there must be an intensive, systematic means of establishing and maintaining quality control. First, data collectors must be adequately trained at the outset of data collection. Second, they must be given timely, frequent feedback concerning the quality of their current and cumulative effort.

UNC-SENIC's quality control sub-system (see the Data Collection & Infection Diagnosis System flowchart, upper right hand quadrant) generates a weekly report on a data collector's effort only 10 working days after forms have arrived from individual hospitals. This report contains three parts:

1. It lists errors made by the data collector which were flagged by the edit program.
2. It lists cases where there is a discrepancy between one data collector's form and another data collector's form where both forms are based on the same patient chart.
3. It indicates the speed at which the data collector is completing forms.

In each case the quality control report shows the data collector how he or she is currently doing, and how the data collector's current effort compares with his or her cumulative effort and with the combined effort of all data collectors in the study.

There is also a national report component to the quality control sub-system. Once a week, reports are sent to the Center for Disease Control which sum up the progress of all data collectors during the past week and cumulatively over the lifetime of the study. In addition, the national report makes note of the data collectors whose records are significantly inferior to ( $>2$  standard deviations from) the average level of data collection quality study-wide.

### THE SYSTEM: Infection Diagnosis

One of the most fascinating and unique sub-systems in the SENIC Project is the infection diagnosis sub-system, commonly referred to as the "Algorithm" (see the Data Collection & Infection Diagnosis System flowchart, lower right hand quadrant). The Algorithm performs an automated diagnosis on each edited data collector form which passes through the system. First, the Algorithm reads in clean patient records output from the edit sub-system. Second, it compresses the forms by eliminating any data not needed for diagnosis. Third, it performs a diagnosis to see if the patient arrived with or acquired an infection during his or her hospital stay. If the Algorithm detects an infection, it notes whether the infection was hospital or community-acquired, when the infection began, and the part of the body believed to be infected.

The Algorithm is currently being refined (or tuned) so as to deliver diagnoses whose accuracy is significantly above that of the Registered Records Administrators (RRA's) and Accredited Records Technicians (ART's) who will be reviewing individual hospital patient charts during the main SENIC study.

### MAINTENANCE OF STATISTICAL INTEGRITY

An effort has been made to preserve the statistical integrity of the study data as it weaves its way through the various stages of data management and analysis. First, archives are kept of all raw, input data. Second, microfilm copies of all forms are maintained as a backup to the archival data on magnetic tape. Third, records are maintained as part of the edit sub-system and the quality control sub-system concerning the nature and volume of edit errors and the amount of automatic recoding done to the data. Fourth, project biostatisticians are consulted frequently. Fifth, data transformations are limited whenever possible. Nevertheless, despite all the precautions taken above, a substantial amount of data manipulation is performed on a daily basis by data processors, statisticians, and programmers.

It is the thankless and exhausting (but necessary) job of project managers to attempt to minimize data transformations by avoidance of last minute data processing crushes since these tend to be the major, error-prone source of most massive, jury-rigged data patches and transformations. Also, it is important to maintain a strict separation between archival data files (which cannot be written onto) and analysis copies of these files where the data can be freely manipulated and massaged.

## DATA SECURITY & INTEGRITY

Data security and integrity are maintained through implementation of a series of procedures. First, when forms arrive from the hospitals they are interactively logged into the computer. Second, forms are microfilmed in case they are misplaced or destroyed, or if there is some question concerning data stored in computer readable format. Third, forms are protected under lock and key in a special forms library where rigid forms checkout procedures are followed. Fourth, backup copies of tapes containing raw forms and tapes containing edited forms are maintained. Fifth, an interactive tape logging system has been implemented which inhibits improper tape usage. Sixth, the master tape log is maintained by operations personnel and is kept in a locked room after regular project office hours. Seventh, a shadow system is being implemented which stores additional copies of important datasets on passworded, archival quality tapes locked in tape storage cabinets. These cabinets are located in one of the most highly secure areas of the project. The data on the tapes is accessible only through the use of an encoded tape log which is kept in the tape cabinets with a copy in a local bank safety deposit box. As new, important datasets are added to the UNC-SENIC system, copies are fed into the various data security and data integrity systems.

## SOFTWARE DOCUMENTATION & SECURITY

During the lifetime of the SENIC Project it is likely that more than 400 months of programmer time will go into the development of project software at a combined personnel and computer cost of well over one million dollars. Thus, it is understandable that the project tools (i.e., the computer programs) that are produced at such an enormous cost should be carefully protected, documented for later reference, and stored where they can be easily accessed.

Efforts are now underway to develop a system to guarantee the security, comprehensibility, and accessibility of SENIC's expensive tools, its computer software. The SENIC Documentation System (SDS) will help to generate and maintain a SENIC library of computer programs and programmer/users guides along with other major SENIC documents including those developed by the statistics, data management, and administration departments.

In the area of software documentation, the library will maintain source code listings of all major computer programs and indexed, bound programmer/user guides to each of the programs. Both the listings and the documentation will be stored in locked cabinets after regular office hours. During office hours the library will be administered by a trained documentation

librarian.

In addition, SDS will capture and maintain computer readable copies of documentation and source code for major programs. In this regard, SDS will function as an online, interactive query and program retrieval system which will complement the physical library. Again, a shadow system will be implemented. It, too, will contain copies of all major programs' source listings. Of note is the fact that individual programmer, statistician, and data management teams maintain their own backup systems.

#### DATA BASE CREATION & ADMINISTRATION

What emerges from the Data Collection & Infection Diagnosis (DCID) System described above (see system flowchart) are edited, diagnosed, quality controlled forms and isolated data cards. The output from DCID, therefore, must still be extensively processed before it legitimately forms part of the SENIC data base (see UNC-SENIC Macro Flowchart).

UNC-SENIC is now in the process of drafting the specification for a data base management system. Certain key functions of this system have already been identified. They are:

1. Merge

The various datasets and card images must be sorted and merged to build complete forms.

2. Archive

The data must be formally archived and the archives updated so as to act as a current backup to the active project data base.

3. Reedit

Additional forms editing will be continually required as needs and specifications change. Also, there will be a significant number of forms rejected by the DCID edit, quality control, and infection diagnosis sub-systems which will need to be cleaned and merged with the rest of the data.

4. Reformat

The initial project data base (post-merge) in its card image format will require no fewer than 40 tapes for storage. The reformat sub-system will act to compress this data base to make processing easier and less

costly.

#### 5. Rectify

Additional manipulation of the forms is required for the purpose of improving algorithm diagnoses.

#### 6. Retrieve

Various subset analysis files will be extracted from the main data base. Also, varied techniques in addition to compression will be employed to make the gigantic amount of project raw and massaged data quickly accessible and relatively inexpensive to retrieve.

#### 7. Report

The penultimate output of the SENIC Project will consist of voluminous statistical publications akin to the reports published after each census by the U.S. Census Bureau. There will be a facility to transfer data base tapes and subset analysis files directly onto printed, bound, indexed volumes and perhaps onto microfilm for later reference by government officials, hospital officials, and scientific researchers.

#### 8. Roundup

Ultimately, there will be a sub-system which will perform the extremely difficult task of summarizing and aggregating the billions of bits of SENIC data and the experience gained over dozens of work years by SENIC Project participants into a few concise volumes.

In addition, the project is training a Data Base Administrator (DBA) who will be responsible for the scientific administration of the SENIC data base and of the data flow leading up to the creation of the data base.

Finally, the SENIC Project is making pioneering use of the multifaceted statistical package, SAS76, recently developed at North Carolina State University (and now available from the SAS Institute in Raleigh, North Carolina). With its canned statistical procedures, its report generation, direct access retrieval, and online query capabilities, SAS76 has many of the attributes of a comprehensive data base management system. To its credit, it is also cheaper to purchase and operate than most commercial DBM systems and is more versatile in the area of data manipulation and statistical analysis.

## CONCLUSION

The SENIC Project has made an excellent software engineering laboratory. Major lessons have been learned in areas of hardware selection; forms design; data entry technology; privacy, confidentiality, and data integrity; in software development, documentation, and security; and in editing, auditing, and quality control. These lessons gained during preparation for the SENIC Project's data acquisition stage will prove to be invaluable as the project embarks on serious development and administration of a large-scale medical data base. The major data acquisition effort of the project begins this month (March 1977) and is scheduled to run over the next 12 months.

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S. FREDERICK D'IGNAZIO III

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## TOTAL INFECTION AND ENVIRONMENTAL SURVEILLANCE SYSTEM (TIES)

S. Frederick D'Ignazio III  
Biostatistics Department, University of North Carolina

## ABSTRACT

In June 1975 Computer Sciences Corporation was engaged by Andersen 2000, Inc., an Atlanta, Georgia air sampler manufacturer, to produce a computerized system which would enable hospitals across the U.S. to monitor operating room air quality and track hospital patients' hospital and community-acquired infections. The system - TIES - is now complete and has already produced 4 cycles of monthly and quarterly reports for participating hospitals.

## INTRODUCTION

Dr. David Sencer, Director of the National Center for Disease Control (CDC) located in Atlanta, Georgia, in his appearance before the U.S. House of Representatives Appropriations subcommittee in late February 1976 testified that infections acquired during hospital visits plague more than 1.5 million patients nationwide at an annual cost of \$1 billion.<sup>1</sup> CDC has deemed the problem of nosocomial (hospital-acquired) infection control to be of such major importance that it has begun a 2-year, \$1 million study to help hospitals across the country determine what can be done to minimize infections. This study, tagged SENIC (Study on the Efficacy of Nosocomial Infection Control), will include a mail survey of 6,500 hospitals to learn the level of commitment of U.S. hospitals to nosocomial infection control and, later, an in-depth, computer-supported analysis of approximately a half million patient histories in 200 hospitals around the country.<sup>2</sup>

In the context of recent CDC efforts, the TIES system is a pioneering venture in the area of nosocomial infection monitoring and control. The nine initial hospitals using TIES are already receiving reports on the characteristics of community-acquired and nosocomial infections contracted during a patient's stay in their institution. They also receive a report which correlates air sampling data from hospital OR's (Operating Rooms) with patient infections.

## SYSTEM CHARACTERISTICS - System Overview

The TIES monthly update and reporting cycle can be divided into 3 major steps and 3 major sets of tasks. The 3 major steps are:

- Step 1 - Batch offline data entry (throughout the month);
- Step 2 - Data base update and batch offline correction (during the last week of each month and the 1st week of the following month); and,
- Step 3 - Report production (extending into the second week of the following month).

The 3 major sets of tasks are:

- Task 1 - Data gathering (performed by hospital nurses);
- Task 2 - Data entry and system operation (performed by Andersen 2000); and
- Task 3 - Update and reporting functions (performed by the CSC software and computer).

The verbal description of the TIES system which follows is summarized in the TIES System Flowchart which appears as Figure 1 on the following page.

#### SYSTEM CHARACTERISTICS - Offline Data Entry

Nurses in each hospital using TIES complete and send to Andersen 2000 a batch of Infection Surveillance forms at the end of each week during a monthly cycle. Each form consists of information on a particular patient-acquired infection. Therefore it would be possible for a given patient to generate >1 infection record during his or her stay in the hospital. Each form is masked and multi-part which allows a hospital to complete and maintain but not computerize certain patient infection information. The patient infection number preprinted on each form is independent of the patient identification number assigned by the hospital. This strengthens the system against a breach of system security and against a violation of a patient's individual privacy. Information contained on the form includes: Infection #, Infection Onset Date, OR #, OR Information, Sex, Mortality, Origin of Infection (Nosocomial or Community), Hospital Service (Department), Predisposing Factors (such as malignancy, diabetes, age, race, etc.), Infection Site (such as urine, blood, wound-surgical), Treatment (such as urinary catheter, tracheostomy, etc.), and, finally, Organism Identification and Sensitivity.

At the end of each month a hospital also sends in Air Quality Surveillance Forms (AQS). Each AQS is a record of up to 24 hours of air sampling performed in an individual hospital OR. An AQS contains the following information: OR #, Time Sample Begins, Time Sample Ends, Date of Sample, Volume of Air Sampled, and Air-Borne Organism Colony Count for each sample. An average sample takes approximately 30 minutes.

When the batches of forms from each hospital arrive in Atlanta, an Andersen 2000, Inc., System Operator manually checks each form for accuracy and completeness and then enters each Air Quality or Infection batch onto tape cassette using a Hazeltine CRT terminal in batch mode.

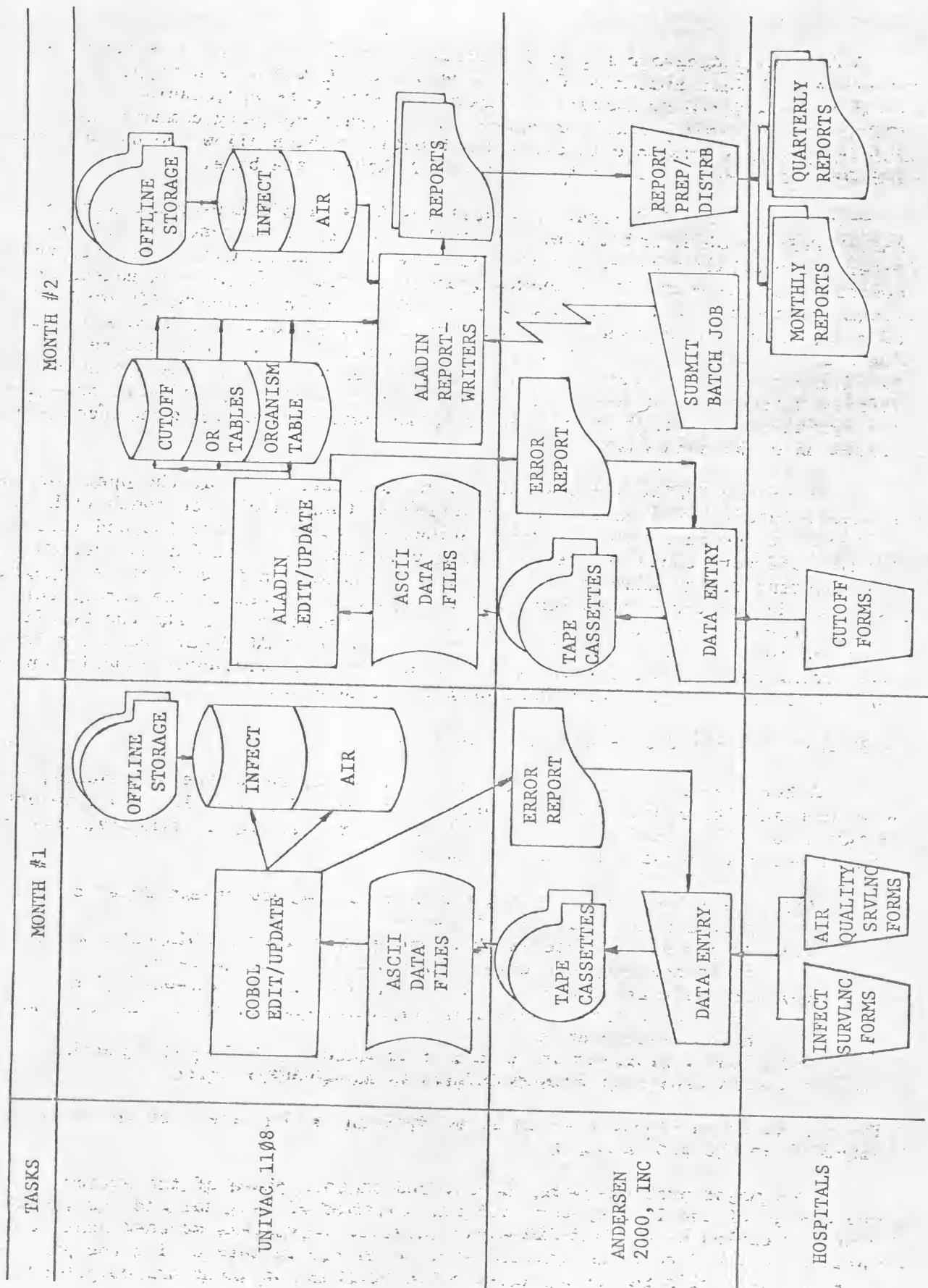
The screen formatting as well as the tape cassette capabilities of the Hazeltine terminal are used. First, the operator reads a "canned" format from a read-only tape onto the CRT screen, with each character loaded in protected, background status. Second, using the HOME, TAB, and edit keys and the terminal's full-screen buffer, the operator enters and edits an Infection or Air Quality form. Forms are then transferred to tape, one at a time, until the completion of each batch.

At the end of each month, taped batches are transferred to the Computer Sciences Corporation computer (a Univac 1108 located in Oak Brook, Illinois) over voice-grade phone lines via a CSC remote concentrator (RCC - a Comten 20) situated in CSC's Atlanta office. Each taped batch is transferred at low speed (300 baud) in paper tape mode and written onto a permanent, keyed, ASCII file residing on the TIES system disk library.

#### SYSTEM CHARACTERISTICS - Edit and Update

The overall TIES system presently consists of some 35 ALADIN and COBOL computer programs, several table files, and two, major ALADIN data bases (INFECT and AIR), all of which reside on magnetic tape (9-track, 800 bpi) for reasons of economy.

Figure 1 TIES SYSTEM FLOWCHART



ALADIN (A Language for Decision Information) is a data base management language much like System 2000 developed by MRI. ALADIN is a proprietary software interpreter written by systems programmers of CSC's teleprocessing division, INFONET. It features batch procedure and interactive query commands and can call PLI (Programming Language Interface) subroutines which allow the use of COBOL and FORTRAN to update and retrieve from an ALADIN data base.

The TIES Update Subsystem consists of 4 major COBOL programs with embedded ALADIN PLI subroutines and a number of ALADIN utilities, system sort/merges, etc. After successfully transmitting the tape cassette data to the computer, the operator submits a batch job stream which causes each form to be edited for range and consistency errors, which loads clean forms onto the AIR or INFECT data base, and which produces an error report flagging each error, error type, and error record key. Later, the operator resubmits the corrected records using the same procedures as in initial record submission. The operator then submits a "correction" batch job stream for record editing and data base update. The operator remains in this loop until all new records have been successfully loaded onto the data base.

After the INFECT and AIR data bases have been updated, the operator takes Hospital Cutoff Forms mailed to Andersen at the end of each month (1/hospital) and loads these onto tape cassette in the same manner as the AQS and Infect forms. Each Cutoff Form contains the following information: Date Current Period Begins, Date Current Period Ends, the Total Patient Population in each of 12 hospital services during the current period. The operator transmits the Cutoff Form tape to the computer and submits a batch job stream which edits the Cutoff Form and loads clean Cutoff Forms onto a temporary ALADIN data base for later use during report production. A new error correction/resubmit loop is now entered until all Cutoff Forms are loaded onto the data base.

#### SYSTEM CHARACTERISTICS - Report Production

After the successful completion of all edit and update procedures, the operator submits a single, batch job stream which includes 13 major, report programs and 4 utility programs, all written in ALADIN. In summary, the job stream accomplishes the following tasks:

- (1) The INFECT and AIR data bases and the executable modules of all programs are read in from tape;
- (2) Programs are executed which produce extract ALADIN data bases of Infect and AQS current- and previous-period data;
- (3) Programs are executed which produce binary, half-word element organism-antibiotic-sensitivity and air-quality-by-OR-type-and-hospital tables; and,
- (4) Report programs are executed to produce the 12 major monthly and (rolling) quarterly Infection and AQS reports.

The Report Production Subsystem is summarized in the flowchart which appears as Figure 1 on the previous page.

Two major problems were encountered in this phase of the systems analysis and design of the TIES system: First, a number of national and individual hospital tables of up to 3,250 words (e.g., 125 organisms matched against 26 antibiotics) had to be maintained simultaneously in core during the production of each hospital's report along with the program and input and output data

structures. This would not have been a problem if we had been using a normal compiler language like COBOL or PL/I. However, the core requirements did stretch ALADIN to its limits. Second, we wished to generate a large number of reports (12) but for economy reasons did not wish to make a large number of passes of the ALADIN data bases which, due to the size of the individual AIR and INFECT records (558 and 509 words/record, respectively) were soon to become quite voluminous.

In short, the first problem was, in part, resolved by loading two elements of data onto each core storage word (integer or floating point, single-precision). The second problem was dealt with by producing smaller, extract data bases from the larger data bases, by the creation of the tables and table files, and causing several report programs to manipulate their own data, create their own tables, and generate a multiple number of reports. The problem was amplified by ALADIN's relatively small load module work area (maximum of 24K), its lack of genuine, callable subroutines, and the difficulty it encountered when reading relatively large ASCII records ( $\approx 460$  words).

The TIES system generates 4 types of major, monthly and (rolling) quarterly reports:

- (1) Cross-Tabulated frequency distribution studies of hospital and community-acquired infections according to hospital department, type of organism, and infection site;
- (2) A comparison between each hospital's success rate in treating infectious organisms and the average success rate of all participating hospitals (26 antibiotic types are matched against 125 organisms);
- (3) A cluster analysis of infections and such associated characteristics as onset date, treatment, predisposing factors, infection site, and organism; and,
- (4) An Air Quality Alert Report which links a patient's infection data with air-borne organisms in the operating room at the time of the patient's operation.

After report production has been successfully completed, the operator submits an interactive job which queues up the reports at a bulk printer site. Next the operator submits a batch job which copies the current reports and the temporary report tables and extract data bases out to tape and then purges these files from the TIES disk library.

Current reports are generated using a medium-speed Data 100 printer at a bulk printer site in Atlanta. After the reports are produced, the operator returns to the Andersen offices, prepares the reports for distribution, and mails them to the individual hospitals. Meanwhile, offline data entry for the new monthly cycle is already in its second week.

## CONCLUSION

Today the TIES system is operated almost entirely in batch mode. However, due to the interactive query and report generation capabilities of ALADIN and to the fact that the system runs on CSC's nationwide time-sharing network (CSTS) the system has the potential to eventually allow individual hospitals to make selective retrievals from both the Infection and Air Quality data bases.

## REFERENCES

1. Price, Valery, The Atlanta Constitution, February 26, 1976, p. 12-B.
2. Dateline: CDC, Vol. 7, No. 10, October 1975, pp. 1-2, 8.

tions (e.g., "the general form of a PRINT statement is line number, PRINT strings, expressions, or both," but at this point neither line numbers, strings, nor expressions had been defined); and it ranges from trivial statements to those which would require chapters for adequate coverage. The authors also attempt to introduce, in a few sentences, such subjects as calculus and regression analysis to readers who are assumed to have no background. The publisher describes this book as a thorough presentation of BASIC with case studies in finance, break-even analysis, quality control techniques, forecasting and optimization in basic business decisions, but the authors have tried to do too much, too quickly, and have done it poorly.—*S. Wertheimer*

**HUME, J.N.P., and R.C. HOLT.** *Structured Programming Using PL/I and SP/k.* (Illus.) Reston, VA: Reston, 1975. xii+340 pp. \$9.95; \$7.95 (paper). 75-23350. ISBN 0-87909-793-0; 0-87909-792-2 (paper). Index; C.I.P.

**SH-C ★★** This book should become an extraordinarily successful introductory computer science text. It is an excellent teaching tool for the high school and college levels. The authors adeptly weave structured programming techniques together with the fundamentals of PL/I. To do this, they employ a series of structured programming subsets of PL/I and SP/k ( $k = 1$  to 8), which systematically enlarge a student's programming ability. The subsets are supported by an actual SP/k compiler developed at the University of Toronto, but the book can be used with any PL/I (e.g., PL/C) compiler. Overall, the authors cover the myriad aspects of programming with commendable detail, clarity and accuracy. Subjects dealt with include: the software/hardware interface; searching and sorting (hash codes, binary searches, bubble sorts); program testing, debugging and maintenance; modular programming and top-down program design; compilers, assemblers and machine language; and the building and selection of appropriate data structures. The book features an example program or block of code on almost every second page, several challenging exercises following each of the 20 chapters, and four useful appendixes on SP/k.—*S. Frederick D'Ignazio*

**KURZBAN, STANLEY A., et al.** *Operating Systems Principles.* (Illus.; Computer Science Series.) NY: Petrocelli/Charter, 1975. xii+468 pp. \$16.95; 75-2400. ISBN 0-88405-294-X. Index; C.I.P.

**P ★** This is another scholarly addition to the publisher's well-respected Computer Science Series, under the general editorship of Ned Chapin. Special care is used in defining the jargon apparently necessary to explain the concepts, history and capabilities of computer operating systems. The authors state that the intended audience is students taking a first course in operating systems theory. Undergraduate courses for which they say the book would be useful include "the undergraduate course of operating system principles" described by the COSINE Committee of the NAE and Course 14 of the ACM Curriculum 68. It is assumed that the reader is familiar with elements of computer hardware, an assembly language and one or more higher-level languages, and has experience in using an operating system. The book should also prove useful as collateral reading for other computer science students and practitioners. Each chapter is accompanied by questions and exercises and a concise set of answers. Well-considered material covers the classification of operating systems, operating system services, data management and other topics. Two shortcomings are perhaps unavoidable: the inherently complex nature of the material leads to vocabulary readily understood only by those already familiar with much of the material presented; and there is a preponderance of references to IBM 360 and 370, which is apologized for on the basis of the authors having had the greatest familiarity with such systems and that the concepts described are not really limited in application only to IBM systems.—*Herbert R. Koller*

**LANE, RON.** *An Introduction to Utilities.* (Illus.) NY: Petrocelli/Charter, 1975. xiv+162 pp. \$9.95. 75-19284. ISBN 0-88405-285-0. Index; C.I.P.

**C-P ★★** As commercial computing systems have matured, manuals and other documents have grown in size, scope and detail, and newcomers to a system may be overwhelmed by detail. Lane has organized a selected set of functions of IBM System/360 and System/370 Utilities which use OS, VS or

VM Operating Systems. He presents a small subset of available functions that provide for most of the IBM user's needs. The author carefully explains his intentions, lucidly presents material, formulates a few rules, and ends with a summary. Details required on each punched card are given for each of each utility, with examples, explanations and motivation for each rule. There are end-of-chapter questions, with Rules for all utility functions are summarized in an appendix. The index is adequate.—*George Birkel, Jr.*

**STARK, PETER A.** *Computer Programming.* (Illus.; Tab Book, No. 752.) Blue Ridge Summit, PA: Tab Books, 1975. viii+506 pp. \$12.95; \$8.95 (paper). 75-24688. ISBN 0-8306-4752-X (paper). Index.

**SH-C ★★** Simply and aptly titled, this excellent book is intended both for prospective computer professionals and people who will use the computer in their own work. In the introduction, the author describes computing materials and related equipment, what they do and what the program does with them. In the following four sections, he develops approaches to programming using successively higher languages. Little mathematical background beyond algebra and trigonometry is required. Stark also describes the (at least for the machine) way of creating a program, introducing symbolic programming, where basic operations are expressed in a simple, suggestive mnemonics, and shows how various data processing tasks are performed with this symbolic language. He discusses FORTRAN with clarity and useful detail. The book is suitable for classroom use and includes 282 problems, an introduction to any of the three language levels, or a reading for high school or vocational school introductory course or for a college computer laboratory.—*Robert Bodine*

**TANENBAUM, ANDREW S.** *Structured Computer Organization.* (Illus.; Prentice-Hall Series in Automatic Computation.) Englewood Cliffs, NJ: Prentice-Hall, 1976. xix+443 pp. \$13.95; 30322. ISBN 0-13-854505-7. Index; C.I.P.

**C ★★** Tanenbaum states in his preface, "This book is intended as a textbook for . . . an introductory course in assembly language programming and computer organization. The only prerequisite is an introductory course in computer science." He succeeds admirably in providing a basic, yet level text on assembly language and computer organization, supplemented by some practical programming in one of the assembly languages, the student should easily understand computer architecture, micro-programming, operating systems, and so on. He or she will also gain an appreciation for the analyst and understand the basic requirements for each of these areas. Certainly, Tanenbaum provides the material to produce a well-rounded individual in the field of general hardware/software. Students with the proper preparation will find *Structured Computer Organization* an excellent text for their second year in computer science.—*Joe K. Cleary*

**WOOLDRIDGE, SUSAN.** *Computer Output Design.* NY: Petrocelli/Charter, 1975. xiii+262 pp. \$11.95. ISBN 0-88405-308-3. Index; C.I.P.

**SH-C-P ★** At first glance *Computer Output Design* might be simply another compendium of examples and descriptions, but, happily, this companion volume to *Computer Input Design* (NY: Petrocelli/Charter, 1974) is a different class. Wooldridge has a clear and direct style, anecdotes freely, without allowing the book to become a series of stories. The book is not a description of algorithmic design, but an excellent description of the operational and systems aspects of medium-to-large volume output. Included are types of output, techniques for error checking and correction, turnaround documents (validity checking material retention, information originator), types of reproduction, security and choosing software and documentation. There are some minor flaws: "Facts" and statistics are mentioned without references. The error in Figure 5.4 (intentionally) ironic. The figure is entitled "Example of a demand deposit accounts," but actually contains nothing (Job Control Language) status messages. Since JCL is a part of every programmer's life, this figure is more realistically intended. *Computer Output Design* could be used as a

production of the film is adequate, with a few lapses. This is not a spectacular or high impact film, but in the hands of a skilled discussion leader it could elicit examination of the many problems involved in treatment of youths convicted for violent crimes.

—James R. Haines

### 370 Education

**MATH MINUS MYSTERY.** Doubleday Multimedia, P. O. Box C-19518, 1371 Reynolds Ave., Irvine, CA 92713; 1975. (Search—Encounters with Science Series.) 16mm. 6 min. Color. \$60.50; \$10 (rental). o.n. 96710. 75-702729.

**C-P Ac** Indiana University is conducting a new teacher education program under a grant from the National Science Foundation. The program is designed to train elementary school teachers to relate mathematics much more closely to the daily lives of their students. *Math Minus Mystery* was produced by Doubleday for the National Science Foundation and Indiana University. It is a promotional film, the purpose of which is to stimulate college and university mathematics departments and elementary school administrations to imitate Indiana University's "math in the real world" approach. The film is technically excellent. However, if you are interested in learning more about IU's program, take the direct approach and write to *Math Methods Project, Department of Math Education Center, Indiana University, Bloomington, Indiana 47401*. The program may dispel mystery from math, but there is little in the film which dispels mystery from the program's methods.—Fred D'Ignazio

**PEOPLE WHO WORK IN MANUFACTURING.** BEA Educational Media, P.O. Box 1795, 2211 Michigan Ave., Santa Monica, CA 90404; 1974. (Prod.: Thomas G. Smith.) 16mm. 17 min. Color. \$240; \$19 (rental). o.n. 1616. 75-703883.

**SH Ac** The film consists of the comments of workers on a Sony television production line, and shots of the production line in action. There is a brief reference by a supervisor to the use of the team approach to assembly (team workers switch tasks fairly often to reduce boredom). The team concept is designed to be more satisfying to workers because they see a more complete product rather than the rather small change usually seen by an assembly line worker. It is also supposed to provide a social atmosphere which stimulates the worker to take more pride in her or his work. Unfortunately, there is no reference to these latter factors in this film. In fact, beyond some comments on the need to inform workers of why they are doing certain things, of new plans by the company, etc., there is very little substantive information presented. It is, in addition, a little Pollyanna-ish: most workers tell how challenging and satisfying their work is (with a couple of exceptions) which is to be expected under the circumstances but might be misleading. The film could be useful in vocational education as a vehicle for discussion.—Karl Hunt

### 389 Metrology and Standardization

**THE METRIC SYSTEM SERIES.** Metrication Institute of America, P.O. Box 236, 1825 Willow Rd., Northfield, IL 60093; 1975. (Prod.: Larry Yust and Sy Wexler.) 16mm. Color. Series \$650; \$65 (rental).

**METERS, LITERS AND KILOGRAMS:** 23 min. \$310; \$31 (rental).

**THE METER:** 11 min. \$150; \$15 (rental).

**THE LITER:** 6 min. \$90; \$9 (rental).

**THE KILOGRAM:** 11 min. \$150; \$15 (rental).

**EA-JH-SH Ac** This presentation of metric system concepts is quite accurate, but it is very slow moving which, in a trial showing, resulted in sleepy, disinterested viewers. However, the detailed relationships between metric units for length, mass and volume are well demonstrated. The only content fault is the (correct) use of specific gravity without any definition of s.g. The three shorter films could be used for reinforcement in the classroom, but the longer film is too long. Teachers should separate showings of each of the shorter films by a few days because many scenes are repeated in each, and the result is boring rather than reinforcing. The soundtrack is frequently silent for

long periods of time. Film is a good medium with which to present this subject; unfortunately, it was not effectively used in this series.—Leo Lutchansky, Jr.

**TEN—THE MAGIC NUMBER.** National Film Board of Canada, 1251 Avenue of the Americas, New York 10020; 1975. 16mm. (animated). (Dir.: Barrie Nelson.) 13 min. Color. \$205; \$20 (rental).

**EA-JH Ac** The film is an entertaining animated fantasy about Canada's conversion to the metric system, which is equally relevant to the United States. However, the actual mathematical content is very small—just the computation of the weight of a fish tank of known dimensions. The computation is not done in both systems of measurement, and it passes too quickly in the metric system to be understood. The rest of the film is all a fantasy concerning the hero's trip into the future, caused by visitors from outer space. This includes a "film within the film" with a silly animated song and dance ("Ten—The Magic Number") to sell the metric system. If a teacher exhibited the relevant computations in classroom discussions, the film could be used instructively. The technical quality of the animation is up to the usual high standards of the National Film Board of Canada.—Nelson L. Max

## Pure Sciences

### 507 Science—Study and Teaching

**SCIENCE AND SUPERSTITION 2nd ed.** Coronet Instructional Media, 65 E. South Water St., Chicago 60601; 1975. 16mm. 10 min. Color. \$140. o.n. 3075.

**EI-EA Ac** Do toads cause warts? Does lightening ever strike twice in the same place? Is luck related to breaking mirrors, walking under ladders, black cats or crossing fingers? This short film illustrates the similarities and differences between science and superstition. Although both result from a desire to understand nature, in science there are clear definitions and careful testing before conclusions are made. The film suggests an experiment to test the crossed-fingers idea: Keep a record of every time the fingers are crossed—did a good thing happen, or not? A tally sheet of about 25 such events shows a roughly equal distribution. The possible psychological effects of lucky charms is implied when a young football player who, thinking he doesn't have his lucky charm, fumbles the ball, and then realizes he did have his lucky charm in his pocket after all. It is doubtful whether this film will have much effect on those with strongly held superstitions; it may, however, be useful for some elementary school classes. The technical quality of the film is adequate.

—John C. Whitmer

### 520 Astronomy

**THE CRAB NEBULA.** Time-Life Films, Time Life Bldg., 32nd Fl., Rockefeller Center, New York 10020; 1972 (released 1975). (Prod.: Alec Nesbitt; a BBC film.) 16mm. 56 min. Color. \$550; \$55 (rental). Accompanying teacher's guide.

**SH-C ★★** This film is about the remarkable, detective story investigation of the life and cataclysmic death of the star whose supernova remnants are known today as the Crab Nebula in the constellation Taurus. Beginning with the record of the supernova's first observation in ancient Chinese chronicles, researchers tell of the detection of the Crab's radio emissions, the discovery of pulsars, the Crab pulsar/neutron star and the mechanism of the Crab's energy source, an optical pulsar. Early studies of emissions from the Crab in the infrared, ultraviolet, and x-ray regions of the spectrum, utilizing balloons and artificial satellites, are also covered. There is a closing report on the supernova-hunting efforts of Sirling Colgate. The film is well written and narrated, and the photography is excellent. The presentation is highlighted by the liberal use of interviews with leading scientists, including Morrison, Ruderman, Bell, Hewish, Gold and Ostriker. The film is a BBC-TV production used in the NOVA television series, but it is not seriously dated. Some background preparation is desirable although not required; the film can serve

LATIN AMERICA: HOW MUCH  
DO THE CHINESE CARE?

*S. Frederick D'Ignazio III and  
Daniel Tretiak*



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S. FREDERICK D'IGNAZIO III AND DANIEL TRETIK

### Latin America: How Much Do the Chinese Care?

This paper examines Chinese interest toward Latin America over the period 1959-1970 by means of a quantitative analysis of the major Chinese international periodical *Peking Review*. The foci of Chinese interest varied during those years. Before the Cuban Revolution, the Chinese attempted to become familiar with Latin America by traveling to various countries there and by inviting Latin Americans of varying backgrounds to visit China. Concurrently, but independent of the success of the Cuban Revolution, China's relations with Latin America increased substantially. In certain respects, Chinese policy toward Latin America resembled that of the U.S.S.R., but unlike the Russians the Chinese encouraged Latin Americans to follow the Cuban example of launching rural-based armed struggles in various countries. During the period 1958-1964, for example, the Chinese engaged with some success in "cultural diplomacy" in Latin America: trade relations increased sharply; contacts with non-Communists of various persuasions first widened, then narrowed; and efforts were made to influence several governments (Brazil, Mexico, and Chile) to establish diplomatic relations with China.

The Chinese also cultivated groups advocating revolutionary change in Latin America. At first they attempted to work through

existing Latin American Communist parties, but they found the parties overly responsive to Soviet policies in Latin America. Next, the Chinese tried to work with the Castroite groups that sprang up throughout Latin America in the early 1960s, but the Cubans and their Latin American followers promptly proved unwilling to accept what they saw as an effort to dominate their revolutionary activity. By 1965, Chinese attempts to match the Soviet Union and to cooperate (and at times apparently even to compete) with the Cubans had failed. As a result, China lost all but symbolic interest in Latin America, appearing to maintain good relations only with pro-Chinese factions of otherwise pro-Soviet Communist parties, while criticizing the policies of both the Cubans (e.g., Che Guevara in Bolivia) and the Soviets (for trading with and giving aid to Latin American non-Communist governments). As Chinese foreign policy emerged after the period of the Cultural Revolution (1966-1968), Latin America was the developing area slowest to benefit from a more accommodating Chinese foreign policy.

*Chinese Attentiveness to and Contacts with Latin America, 1959-1966*

We shall try to assess Chinese attentiveness to Latin America by examining the amount of space devoted to this part of the world in the columns of the *Peking Review*, the most prominent of Chinese publications designed for circulation abroad. More specifically, we shall analyze the amount of press coverage given to revolutionary activity in Latin America, as well as to contacts between the Chinese and Latin Americans. Before presenting our data, however, we shall comment briefly on Chinese policy in Latin America during the 1950s.

Until the Cuban Revolution in 1959, China's policies toward Latin America were similar to those followed by the U.S.S.R.: both major Communist powers were pursuing what might be called "cultural diplomacy"—a non-revolutionary foreign policy. The U.S.S.R. made efforts to improve its diplomatic and trade ties with the various Latin American regimes, to promote contacts with Latin American elites, and to encourage the local Communist parties to gain more mass support (especially among university students and trade unionists in urban areas). The opposition of the Soviet-supported Latin American Communist parties and the U.S.S.R. itself to the *status quo* was often explicitly stated, but it was essentially rhetorical after the downfall of the Guatemalan revolution in 1954.

Chinese policy toward Latin America during this period coincided

with that of the Soviet Union. The Chinese sought to increase their contacts with Latin American elites, to raise their diplomatic and trade status in Latin America, and to improve their relations with and position among several Latin American Communist parties. Reports of Chinese-Latin American contacts rose sharply during the 1950s, peaking in 1960.<sup>1</sup> But this trend did not continue. As seen from Table 1 and Fig. 1,<sup>2</sup> by 1966 there were only 33 percent as many

TABLE 1. ANNUAL CHINESE REFERENCES TO LATIN AMERICA, REVOLUTIONARY ACTIVITY IN LATIN AMERICA, CONTACTS BETWEEN CHINESE AND LATIN AMERICANS, AND CHINESE DECISIONMAKER ACTIVITY WITH RESPECT TO LATIN AMERICA, 1959-1966; AND RELATED ANNUAL PERCENTAGES

Year	References to Latin America <sup>a</sup>		References to Revolutionary Activity <sup>b</sup>		References to Decision- maker Activity <sup>c</sup>		References to Chinese Contacts <sup>d</sup>	
	% of Total	% of Total	% of Total	% of Total	% of Total	% of Total	% of Total	
1959	59	12	6	2½	35	8½	36	14
1960	103	21	37	14	64	16	91	36
1961	63	13	12	4	113	28	73	29
1962	53	11	32	12½	67	16½	20	8
1963	53	11	36	14	50	12½	18	7
1964	71	15	57	22	42	10½	9	4
1965	51	10	37	14	31	7½	3	1
1966	34	7	43	17	2	½	2	1
Total	487	100%	260	100%	404	100%	252	100%

<sup>a</sup> That is, the number of articles in *Peking Review* which mention Latin America.

<sup>b</sup> The number of references to "guerrilla warfare," "armed struggle," and the like in Latin America.

<sup>c</sup> The number of references to the activity of the eight top Chinese decision-makers with respect to Latin America: Mao Tse-tung, Liu Shao-ch'i, Chou En-lai, Chu Teh, Ch'en Yi, P'eng Te-huai, Kuo Mo-jo, and Ch'u T'u-nan, Chairman of the Chinese-Latin American Friendship Association.

<sup>d</sup> The number of contacts between Chinese and Latin Americans both in China and in Latin America.

1. According to William Ratliff, Chinese-Latin American contacts rose from 75 in the period 1953-1954, to 155 in 1955-1956, to 235 in 1957-1958, and to 900 in 1959-1960. William Ratliff, "Chinese Communist Cultural Diplomacy Toward Latin America, 1949-1960," *Hispanic-American Historical Review*, XLIX, 1 (February 1969), pp. 57-58.

2. The data for this section are derived from Frederick D'Ignazio's senior honors thesis at Brown University, "Chinese-Latin American Relations: Policy



Fig. 1. Annual Percentages of Chinese References to Latin America, Revolutionary Activity in Latin America, Contacts Between Chinese and Latin Americans, and Chinese Decisionmaker Activity with Respect to Latin America, 1959-1966.

references to Latin America as there were in 1960. By contrast, the *Peking Review* reports a sharply rising amount of revolutionary activity in Latin America, reaching its peak in 1964. Yet Chinese contacts with Latin America, after a high in 1960 and 1961, dwindled down to practically nothing by 1965 and 1966. Two alternative explanations can be offered for this behavior: first, that during this period the Chinese were shifting from a relatively peaceful "cultural-diplomacy" phase to a revolutionary phase because they recognized the opportunities which "the rising tide of revolution" presented to them; and, second, that although Chinese policy may have been initially revolutionary (after the Cuban Revolution), it became increasingly non-revolutionary after 1961 owing to setbacks received in important areas.

China-watchers writing in the early 1960s felt that China's interest in Latin America, as evidenced by contacts made with Latin Americans and references to Latin America in Chinese periodicals, was correlated with the rising tide of revolution which the Chinese per-

and Perceptions" (May 1970), which was based on an examination of every issue of the *Peking Review* from 1959 to 1966.

ceived in Latin America.<sup>3</sup> They paid more attention to the fiery quality of Chinese rhetoric (culminating with Lin Piao's "People's War" speech in 1965) than to the more substantive indicators such as the frequency and country concentration of references, and references to contacts and decisionmaker activity. Thus, as our indicators from the *Peking Review* show, China's "real interest" in Latin America (i.e., contacts with Latin Americans) declined after 1960.<sup>4</sup> Chinese

TABLE 2. CHINESE REFERENCES TO INDIVIDUAL LATIN AMERICAN COUNTRIES, REVOLUTIONARY ACTIVITY, AND CONTACTS WITH CHINESE, 1959-1966

Country	References to Individual Countries	% of Total	References to Revolutionary Activity	% of Total	References to to Contacts with Chinese	% of Total
Cuba	167	35	60	23	105	42
Brazil	70	15	19	7½	38	15
Venezuela	32	6½	39	15	13	5
Dominican Republic	30	6	11	4	3	1
Chile	25	5	6	2½	20	8
Colombia	23	5	30	11½	5	2
Peru	22	4½	26	10	9	4
Panama	20	4	2	1	4	2
Guatemala	17	3½	24	9	7	3
Ecuador	16	3	12	4½	6	2
Argentina	14	3	6	2½	12	5
Bolivia	13	2½	3	1	13	5
Nicaragua	10	2	9	3½	3	1
Mexico	9	2	1	½	6	2
Paraguay	8	1½	8	3	5	2
Honduras	7	1½	4	1½	3	1
Total	483	100%	260	100%	252	100%

3. See, e.g., such sources as *China Topics*, YB 356 (IR-LA 3), December 1965; Dorothy Dillon, "International Communism and Latin America—Perspectives and Prospects," *Latin American Monographs*, Nos. 17-20 (Gainesville: University of Florida Press, 1961-1962), p. vii; Joseph Lee, "Communist China's Latin American Policy," *Asian Survey*, IV, 11 (November 1964); Rollie E. Poppino, *International Communism in Latin America* (London: The Free Press of Glencoe, 1964); Shen-Yu Dai, "Sugar-Coated Bullets for Latin America," *Current Scene*, I, 21 (December 23, 1961).

4. D'Ignazio, *op. cit.*, pp. 4-10, 23-39, 44-87, 132-174, Appendix; Michael Godley, "Peking's Employment of Informal Diplomacy—Some Reflections on a Neglected Aspect of Chinese Foreign Policy," unpublished manuscript, January 1969; Robert Blum, *The United States and China in World Affairs*

real interest after 1960 lay in Cuba; it was not correlated with the rise of revolutionary activity in Latin America but with Chinese Cuban policy (see Tables 2 and 3, showing overwhelming Chinese preoccupation with Cuba).

TABLE 3. CHINESE REFERENCES TO CUBA AS A PERCENT OF ALL CHINESE REFERENCES TO LATIN AMERICA COMPARED WITH CHINESE CONTACTS WITH CUBA AS A PERCENT OF ALL CHINESE CONTACTS WITH LATIN AMERICA, 1959-1966

Year	References to Cuba	References to Latin America	Cuban References	Chinese Contacts with Cuba	Chinese Contacts with Latin America	Cuban Contacts
			Latin American References			Latin American Contacts
1959	18	59	31	7	36	19
1960	38	103	37	32	91	35
1961	34	63	54	34	73	41
1962	26	53	49	12	20	60
1963	24	53	45	12	18	67
1964	17	71	24	5	9	56
1965	6	51	12	1	3	33
1966	4	34	12	2	2	100
Total	167	487	—	105	252	—

The success of the Cuban Revolution, however, was not the only factor in the drastic alteration of Chinese policies toward Latin America. The widening split between the U.S.S.R. and China from 1960 forward was another such factor. As the rift between the two nations extended to a global level, the Soviet Union was no longer willing to provide the Chinese with an entree to Latin American society, political figures, and local Communist parties. The Chinese, for their part, were no longer willing to subordinate their goals in Latin America to Soviet goals, nor to concede to the U.S.S.R. the

(New York: McGraw-Hill, 1966); William E. Griffith, *Sino-Soviet Relations, 1964-65* (Cambridge, Massachusetts: The M.I.T. Press, 1967), and *The Sino-Soviet Rift* (Cambridge, Massachusetts: The M.I.T. Press, 1964); Ernst Halperin, "Peking and the Latin American Communists," *China Quarterly*, No. 29 (January-March 1967); Bruce D. Jackson, *Castro, the Kremlin and Communism in Latin America* (Baltimore: The Johns Hopkins Press, 1969); Ratliff, *op. cit.*; Bureau of Intelligence and Research, U.S. Department of State, *World Strength of Communist Party Organizations*, 21st Annual Report, 1969 ed.

loyalty of Latin American Communist parties. Thus, the Chinese struck out on their own to wrest control of the Latin American Communist parties from the U.S.S.R., arguing that violent revolution was necessary in Latin America. They were unable to accomplish this goal, however, and after the Cuban missile crisis in October 1962 they increasingly engaged in splittist politics, encouraging dissatisfied Communist Party members to leave pro-Soviet Party organizations and establish new ones that proclaimed allegiance to the Chinese. The Chinese inability to wean away Latin American Communists is suggested by the decline in visits by Latin American Communist Party delegations to China. In 1959 there were thirteen references to Latin American Communist Party "cultural missions" to Peking. In 1960, there were only four references. After 1960 there were practically none. Moreover, after 1960 there were few references to Latin American Communist parties at all.

After the triumph of the Cuban Revolution and the rise of Fidel Castro in early 1959, the political situation in Latin America changed substantially. The change occurred in two stages. In the first, as the Cuban Revolution and its leaders turned to the left, they became the inspiration and ideal for Latin American nationalists and leftists. The Chinese quickly realized that the idealization of the revolution, and its catalytic effect on leftist revolutionary groups, held profound significance for the Latin American revolutionary movement. Hence, they moved very early into Cuba to see what part they could play in the continental revolutionary process, either in providing direction at the center (Havana) or in encouraging revolutionary activity in individual Latin American countries. In turn, the Chinese hoped that the Cubans would help them gain more support from the pro-Soviet Communist parties in Latin America<sup>5</sup>; would lend support for Chinese global ideological and policy positions at international Communist conferences and meetings; and, failing that, would oppose Soviet positions or at least remain neutral in the Sino-Soviet dispute.

What the Chinese did not expect was the autonomy of the Cuban revolutionary nation-state. This autonomy was due to the leadership of Fidel Castro and to the unique appeal of the Cuban Revolution for Latin American leftist-nationalist groups. From 1959 on, Castro

5. Daniel Tretiak, "Cuba and the Soviet Union: The Growing Accommodation," Rand Memorandum RM-4935-PR (Santa Monica, California: The Rand Corporation, July 1966); Halperin, *op. cit.*; Jackson, *op. cit.*; Alain Joxe, "Sino-Soviet Dispute and Revolutionary Movements," in Claudio Veliz (ed.), *Latin America and the Caribbean* (New York: Praeger, 1968); Lee Lockwood, *Castro's Cuba, Cuba's Fidel* (New York: Vintage Books, 1969); Martin Kenner and James Petras (eds.), *Fidel Castro Speaks* (New York: Grove Press, 1969).

was determined not to allow his movement, and the forces that it unleashed, to be subordinated to or manipulated by another power, whether it be the United States, China, or the Soviet Union.

The second and perhaps decisive stage followed on the heels of the October 1962 missile crisis. Castro, intent upon reasserting his leadership among the Latin American activist left after the damaging missile episode, stepped up his efforts to promote the continental revolution. But while Cuban policy during the initial part of the second stage seemed to run parallel with Peking's militant position, the Chinese had little success in gaining an influential role in the *fidelistas*-sponsored revolutionary movement. In part this was attributable to the uniquely Latin American appeal of *fidelismo*. Additionally, however, it was due to Havana's eventual *rapprochement* with Moscow, which signified Cuba's alignment with the latter in the Sino-Soviet dispute. This was signaled by Castro's two visits to the U.S.S.R., in May 1963 and January 1964, and was confirmed by the November 1964 conference of Cuban, Soviet, and Latin American Communist representatives, which supported Moscow and the pro-Soviet Latin American Communist parties in their quarrel with Peking. Hence, as Table 3 dramatically illustrates, there was a sharp falling off of *Peking Review* references to and contacts with Cuba in 1964 and thereafter.

If the Chinese goals in Latin America (as translated through their relationship with the Cubans) depended on their success in gaining control of the real revolutionary movements, one would expect them to show interest in areas of significant revolutionary activity and to establish contact with local revolutionary groups. From Fig. 1 above, however, one can see that the Chinese leaders' interest in and activity with respect to Latin America dropped at the very time they perceived revolutionary activity to be increasing in the area. Likewise, it appears (see Table 2) that on a country-by-country basis there is little correlation between Chinese interest in Latin America and revolutionary activity in the area as the Chinese perceived it. The revolutionary activity is reported to have taken place mostly in Venezuela, Colombia, Peru, and Guatemala (in that order); Chinese contacts were in Brazil, Chile, Venezuela, and Bolivia. Venezuela, it might be noted, is the only country on both lists; but while it accounted for 15 percent of revolutionary activity, Venezuela had only 5 percent of the contacts.

Chinese interest in Latin America after 1960 focused on Cuba and was maintained only as long as the Chinese felt that they were influencing or had a reasonable chance to influence Cuban foreign policy *vis-à-vis* China itself, the Soviet Union, and Latin America, in that order. When Chinese policymakers saw their chances to influence Cuba rapidly fade, beginning around 1963, they lost interest in Cuba,

and as a result in the rest of Latin America. By the time the Cultural Revolution began (1965-1966) the Chinese were at odds with the Cubans, and their interest in the rest of Latin America was negligible.

*Chinese Policy Toward Latin America, 1967-1970*

Chinese policy toward Latin America during the period 1965-1970 was markedly different in substance and style from that of the U.S.S.R., which was quite flexible in certain respects. The U.S.S.R. began to have economic and diplomatic dealings with anti-Communist regimes after the mid-1960s, and with such military-nationalist regimes as those in Peru and Bolivia in the late 1960s. Throughout this period, Soviet state-to-state relations were relatively normal not only with a number of Latin American governments hostile to Communist parties, but also with ones closely aligned with the United States (e.g., Argentina, Brazil, Colombia, and Venezuela). The Chinese, on the other hand, theoretically and practically demonstrated little if any tolerance or amity for any Latin American government, presumably as a result of the inward reorientation caused by the Cultural Revolution. Trade relations were kept at a minimum during the Cultural Revolution, and no efforts were made to improve state-to-state relations. Of the Third World areas, Latin America as a whole received less attention than either Africa or Asia from mid-

TABLE 4. CHINESE ATTENTION TO ASIA, AFRICA, AND LATIN AMERICA, 1966-1969 <sup>a</sup>

Area	1966		1967		1968		1969	
	Jan.- June	July- Dec.	Jan.- June	July- Dec.	Jan.- June	July- Dec.	Jan.- June	July- Nov.
Asia (excluding the Middle East)	35.27	24.27	24.35	43.90	27.53	30.98	22.71	32.35
Africa	3.62	3.27	3.30	5.60	7.44	5.12	3.09	6.36
Latin America	7.20	3.18	0.40	1.30	4.15	2.82	6.37	2.31

<sup>a</sup> This table is derived from data in D. Tretiak's article "Is China Preparing to 'Turn Out'? Changes in Chinese Levels of Attention to the International Environment," *Asian Survey* (March 1971), pp. 219-237. Figures are the percent of total attention over a six-month period to the international system devoted to each area. Totals amount to less than 100 percent because other categories are not included.

1966 to 1969, as Table 4 shows. For example, only during January-June 1969 was Chinese attention to Latin America greater than its attention to Africa.

As the 1960s drew to a close, Chinese lack of interest was evident in the fact that when military nationalist governments emerged in Peru (1968) and Bolivia (1969), the Chinese were reluctant to view these events favorably. Only in late 1970 did the flexibility characteristic of post-Cultural Revolution foreign policy begin to become manifest *vis-à-vis* Latin America. Chinese relations with Cuba warmed somewhat, and the Chinese responded favorably to the election of Salvador Allende as President of Chile.<sup>6</sup>

If the Chinese response to the events in Chile, and to a lesser extent in Bolivia, presages a new and more accommodating policy toward Latin American political and economic trends, such a development may mean that in some ways Chinese policy toward Latin America has gone full circle during the past fifteen years. China's initial efforts with respect to Latin America were apparently aimed at attaining Latin American backing for the legitimacy of the People's Republic of China as the government of China, rather than at advocating radical changes in Latin America's political order. After the complex but essentially fruitless relationships which China attempted to develop during the 1959-1965 period, present Chinese policy may be a repetition of that enunciated in the mid-1950s. However, in contrast to what occurred then, China's foreign policy toward Latin America today may meet with a responsive audience in several Latin American states. Trade and political relations are likely to develop with non-Communist governments and with Cuba.

From 1965 to 1970, the Chinese stressed a policy line toward Latin America which emphasized the main elements of what might be called the Chinese model for revolution in the developing world: armed struggle launched in rural areas by men willing to be guided by Mao's thought in gaining peasant support for their effort. Nevertheless, as we have pointed out, despite their rhetoric, pro-Chinese Latin American Communists have been loath to launch rural-based struggle.

#### *Postscript*

Since 1970, Chinese policy toward Latin America has fitted rather neatly into the general Chinese foreign policy pattern. China has successfully established diplomatic relations with several Latin

6. John Gittings, "The Road to Peking," *Far Eastern Economic Review*, October 31, 1970, p. 17.

American nations (Chile, Peru, Mexico, and Argentina—and barely missing with Bolivia) and has begun to redevelop trade relations with Brazil. Additionally, the Chinese have correctly sensed that the Latin Americans were angry at both the United States and the Soviet Union over the matter of fishing rights in their territorial waters. Hence, China has ardently supported Latin American nations in their quarrels with both super-powers, undoubtedly gaining political capital in Latin America in the process.

As for the Latin American pro-Peking Communist parties, they seem to have been virtually lost in the rearrangement of Peking's foreign-policy priorities. References in the Chinese media to their activities have dropped markedly in the past two years.

In sum, the Chinese are evincing interest once again in advancing China's diplomatic, political, and economic—rather than revolutionary—objectives in Latin America. Cuba is no longer singled out for special treatment. The goals of Chinese foreign policy toward Latin America of the middle 1950s seem to be finally being realized in the early 1970s.

S. FREDERICK D'IGNAZIO III (M.A., Fletcher School of Law and Diplomacy) is a law student at the Washington College of Law, American University, Washington D.C.

DANIEL TRETIK is Lecturer in Political Science at York University, Toronto, Canada. During the summer of 1971 he was a visiting Research Associate at Cornell University, working with the Project on the International Relations of East Asia. He has published extensively on various aspects of Chinese relations with Latin American, particularly Cuba. In early 1972, as co-chairman of the U.S. Committee for New China Policy, he traveled to the People's Republic of China. There, members of his delegation, as guests of the Chinese People's Institute of Foreign Affairs—the first American group so honored—met with many Chinese officials, including Premier Chou En-lai.

# The Teacher Explorer Center: Providing Techniques & Training in Multimedia Instruction

by FRED D'IGNAZIO, Director  
Teacher Explorer Center  
East Lansing, Mich.

In the fall of 1989 Michigan's Department of Education awarded a grant to East Lansing Public Schools to create a Teacher Explorer Center (TEC) as a model classroom of the 21st century. The center is co-sponsored by the state's Department of Education, East Lansing Public Schools and Ingham County Intermediate School District.

Over the next several months, the TEC staff contacted dozens of technology manufacturers to see if they would become business partners. By the beginning of March 1990, 27 firms had agreed, pledging a total of more than \$1 million in resources to the center. Three companies in particular contributed substantially: IBM Corp.'s Lansing branch office; Sony Showcase, a Lansing-based audio-visual equipment company; and Data Image, a Midland, Mich. firm specializing in computer-projection products for the classroom.

## The TEC Model

During March and April 1990 the Teacher Explorer Center received several shipments of equipment from its business partners. East Lansing Public Schools, under the leadership of its district data services director, Larry Freds, donated a complex of two classrooms and an office plus furniture, utilities (including air conditioning for the summer workshops), room renovation, administrative and custodial support, and technical and manual help in constructing the center.

In April a flyer was sent to 75,000 Michigan educators and the TEC began registering teachers for its spring and summer six-hour training workshops.

On May 21, 1990 the TEC conducted its first workshop. The five teams of teachers and administrators who attended this inaugural workshop, and all

succeeding workshops, came from school districts across the state. During the weeks that followed, an additional 500 Michigan educators attended the center's one-day workshop. And 97 percent of those who received training said they found it to be "valuable" or "extremely valuable." To date, the TEC has received requests for training from over 4,000 teachers representing almost one-fourth of Michigan's school districts.

## Expanding Influence

The Teacher Explorer Center has received publicity from all over Michigan, from around the U.S. and from abroad. Television crews from local and national news programs have visited and the TEC has been featured in numerous newspaper and magazine articles. Inquiries come from as far away as Ireland, Australia, the United Kingdom, Canada and Mexico.

Based on the huge statewide demand for the TEC's workshop, the State Board of Education recently voted to renew the grant to the center for another year (October 1, 1990 through September 30, 1991). Under its new grant the TEC can expand its training program from two to five days per week, add multimedia telecommunications strategies to its curriculum, and help two "sister" explorer centers get started in other parts of the state.

The TEC's sister centers—Oakland University in Rochester, Mich., and Bay de Noc Community College—received funding from the State Board of Education in mid-November of 1990. The new centers will specialize in teacher training; in undergraduate, preservice teacher instruction; in vocational training; in continuing education; and in reading instruction. All three centers are already conducting an interactive



A TEAM AT ONE OF THE MULTIMEDIA R&P CENTERS

exchange via modem. In the future they hope to offer two-way telecourses via satellite, cable and fiber-optics. And the three are actively recruiting new school districts, regional training agencies and institutions of higher education to join an expanding *network* of TECs. The Michigan Department of Education hopes that by the mid-1990s there will be a cluster of Teacher Explorer Centers regionally distributed across the state running teacher-training courses for preservice and inservice teachers.

## Key Teaching Strategies

The Teacher Explorer Center is organized around five key teaching strategies for the 1990s:

- cooperative learning;
- critical and creative thinking;
- classroom publishing;
- thematic "whole-language" inquiry; and
- learners taking responsibility for their learning.

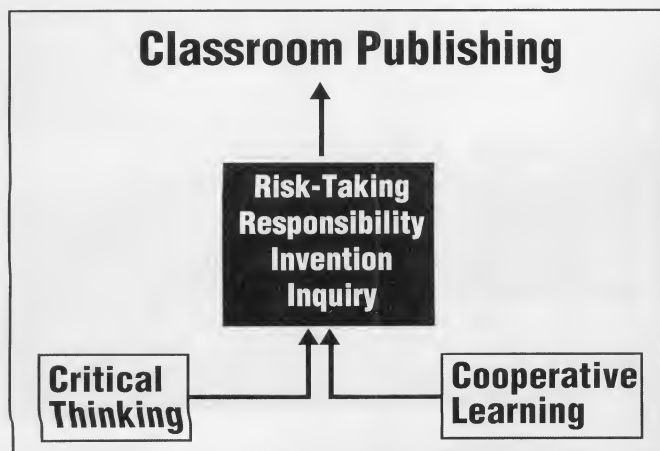


FIGURE 1: TEC'S CORE STRATEGIES

Figure 1 graphically shows how these strategies relate to one another. To implement them, the TEC has five "multimedia research and publishing (R&P) centers" around the classroom. Each R&P center is utilized by a team of four participants for instant multimedia publishing. Each R&P comprises:

- two computers;
- a videodisc player;
- an audio CD player and a CD-ROM drive;
- a VCR;
- a TV;
- a video-capture card;
- a camcorder;
- a microphone; and
- an audio-capture card.

In addition, all R&Ps are tied via a Token Ring network to a laser printer, a color dot-matrix printer, a scanner, a 600MB file server and a CD-ROM optical server. Every educator team has instant access to resources that include Grolier's Electronic Encyclopedia, World Book's Information Finder, Microsoft Bookshelf, National Geographic's Mammals and, on a stand-alone server, Britannica/Compton's MultiMedia Encyclopedia.

The TEC maintains a sizable CD library containing dozens of audio CDs from sponsor Windham Hill Records, as well as other discs that offer thousands of songs, speeches and sound effects. The center also has a library of 12" videodiscs including all 40 volumes of The Video Encyclopedia of The 20th Century; five sets of the Martin Luther King Jr. disc; WGBH-Nova's Pathfinders; National Geographic's GTV; science discs from Optical Data Corp. and Videodiscovery; classic movie, art, and literature discs from The Voyager Co.; the National Gallery of Art disc; Scholastic's Hurricane Hugo; ABC News InterActive's The '88 Vote, In the Holy Land and For All Mankind titles; plus many more discs that teach science, literature, social studies, art and world affairs.

In addition, several advanced audio, video and computer-display technologies are demonstrated at the TEC. These include:

- MIDI keyboards to create audio environments for learning;
- Audio-capture cards to add sounds to student publications;
- Powerful, miniature, amplified speakers;
- Surround-sound audio for "swear-you-are-there";
- Video "wallpaper";
- CoVid 123-A VGA to S-Video converter;

(continued on page 92)

## Explorer<sup>(continued)</sup>

- Sony 41" rear-projection, S-Video monitor;
- Sony face-to-face digitizing video telephones;
- Sharp XV-100 liquid-crystal video projector;
- Epson Crystal Image video projector;
- Proxima MultiMode LCD data display;
- Dukane portable overhead projector; and
- 3M Model 4080 color LCD data display.

### Expectations vs. Reality

Every educator, parent, community leader or policymaker is eligible to visit the Teacher Explorer Center and take its one-day training workshop. (The Michigan State Board of Education grant enables Michigan educators to attend the workshop for free.)

After the workshop ends, participants fill out an evaluation survey in which they critique the six-hour program and rate their experiences. The first question in the survey asks, "What did you think the Teacher Explorer Center would look like before you entered the room?" The second question asks, "What did you expect to learn before you entered the room?"

In the past, participants' answers to these questions were a real eye-opener! Most teachers had no idea what to expect. Many expected the TEC to look like a futuristic movie set, something straight out of "Buck Rogers." And almost no one anticipated the real thing: an almost-ordinary, high-school classroom with normal high-school tables and chairs organized as cooperative-learning centers in a circle around the room.

Almost everyone also expected the day to be a series of glitzy presentations on "the classroom of the future." Again almost no one anticipated that teachers were expected to roll up their sleeves the moment they arrived and dive right into a team-publishing project to make a videotape to take back home.

To prepare teachers for their day at the center we now send out a "What to Expect" flyer. We also give each team a "room map" showing the teacher in the center of an inquiry-driven classroom that is powered by student teams using high-tech tools to perform multimedia research, investigation and publishing. The teacher functions as an explorer, a content specialist, a learning specialist and a resource expert in this new type of classroom.

We have designed the one-day workshop around vertical teams composed of one administrator and three teachers. At the beginning of the workshop we ask teachers to look for things they can do *now* back in their own classrooms. And we ask the administrators to think *strategically* about how they can train their teachers, purchase new technology and plan new learning environments for the 1990s and beyond.

## Strategies for Getting Started

Getting started is often the hardest part in any endeavor. At the East Lansing TEC, each team of workshop participants is given a Starter Kit that contains, among other things, a strategy for setting up four different levels of multimedia classrooms:

**Level One: Do-It-Yourself Classroom Learning Center**

**Level Two: Teacher Presentation Center**

**Level Three: Multimedia Training & Publishing Center**

**Level Four: Teacher Explorer Center**

The kit describes each level in great detail, but in general, Level One is the quickest and least expensive way for a school to get started while Level Four is the most time-consuming and most expensive.

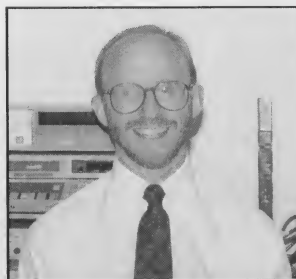
Describing a multimedia classroom in terms of levels can assist school districts to design a *technology plan*. Level One can be part of phase one of a district's technology plan. Level Two is implemented after phase one; and so on till Level Four is a reality.

On the other hand, a district could reach out to its students' parents and business community for a partnership to implement Level Four (TEC) immediately. Also, there are numerous state, federal, and private-foundation grant programs that may potentially be used to fund the creation of a TEC, including grants targeted for drug education, special-education and at-risk students.

The important thing is for a district to begin *now*. Every district, no matter how rich or poor, big or small, can use the tools and strategies just described to train teachers and revolutionize classroom learning. You can begin with big bucks and big ambitions; or you can begin small, simple and be experimental. Either way, as hundreds of Michigan teachers have learned, it is now possible to make classroom learning more exciting than MTV. ■

If you are interested in the Teacher Explorer Center and would like to visit us or receive more information about our program, please contact:

Sharon Goth-Tew, Administrative Director  
Teacher Explorer Center  
East Lansing Public Schools  
509 Burcham Drive  
East Lansing, MI 48823  
Voice: (517) 337-1781, Ext. 58  
Fax: (517) 337-8171



FRED D'IGNAZIO

Fred D'Ignazio is director of the Teacher Explorer Center. He is the author of over 20 books, a national TV and radio commentator on education and technology, and an internationally known expert on multimedia classrooms and cooperative learning. He has presented multimedia workshops in over 60 school districts around North America and has held faculty positions at institutes in Brazil, Portugal, England, Canada and the U.S.

# A Typical Day at the Teacher Explorer Center

Teri, a teacher, arrives at East Lansing High School for her free workshop. As she enters the Teacher Explorer Center she sees "tiny tech" everywhere: computers, video cameras, CD players, VCRs, TVs, videodisc players, CD-ROM jukeboxes, miniature speakers, microphones and more. At the front of the room is a giant TV monitor; TV and computer screens surround her. Dancing across the screens are electronic slide shows; animations; CNN's live, global news broadcast; and images of Martin Luther King, Jr., Hurricane Hugo and Mother Teresa. Coming from two, tiny speakers are the sounds of booming surf.



THE BEGINNING OF EACH TEAM'S EXPLORATIONS

## Immediate Immersion

A small, bearded man walks up and greets her. It is Fred D'Ignazio, instructor and the TEC's director. He barks out an itinerary, even before Teri has fully entered the room: "Sign the workshop roster," he says. "Put on a name tag. Pick up your folder. Select a team workstation. Sit down with your team and begin your first project."

The room has five tables, arranged in a circle. Each table has its own video camera, computer, VCR, videodisc, CD player and TV. "These are your team research and publishing centers," D'Ignazio says. "You'll be publishing a videotape journal of your experiences today as teacher/explorers. You can take the tape home, pop it into any VCR, and share your experiences with your school and district."

Teri gets together with the other members of her team and they find a workstation. "This is a workstation of tomorrow built from the equipment of today," D'Ignazio explains. "By the mid-1990s, everything on this table will shrink down and *fuse* into a single multimedia computer that can fit on your lap. It will handle full-motion video; hi-fidelity, digital sound; telephone and fax communications; and have billions of words of storage. And," he predicts, "it will cost less than a \$1,000."

## Lights, Camera, Action!

To demonstrate what TEC workstations can do, D'Ignazio dims the lights.

The voice of President Kennedy fills the room and his TV image appears on two huge screens. It is the early 1960s and Kennedy is launching a mission to the moon. Kennedy disappears. It is 1969 and the scene is Cape Canaveral. The perspective is that of being only inches away from the rocket that launched the Apollo astronauts on their historic lunar journey as it is taking off. The floor vibrates; a roaring fills the air; gashes of flame and smoke flood the screens.

D'Ignazio turns the lights back on. "Kids ask, 'Why study science?'" he says to the participants, "With a teacher station like this one, any teacher can take students on a field trip to the moon. Then young people will know why science is important—and more exciting than a monster roller coaster!"

Over the next six hours Teri and her team members explore this new world of multimedia and multi-sensory learning. They create an electronic field trip to The Louvre, journey inside an exploding volcano, witness a chemical reaction at the molecular level and take an aerial tour of French chateaus along the Loire River. The team does this by freezing videodisc-based images and capturing them as computer files for later use. Sounds can also be captured from videodiscs then played back by on-screen buttons designed with software.

Teri and her team also explore titles stored on the CD-ROM "jukebox" networked to each team's workstation. They dive into electronic encyclopedias

and various CD-ROMs with content ranging from x-rays of bones moving under a person's skin to digital "movies" of cheetahs and giraffes galloping across the African plains.

Along the way, Teri's team creates a videotape "journal" of their day at the Teacher Explorer Center. The tape features animated computer graphics, digital sound effects and music from CDs, plus narration by team members on the day's experiences as they happen.

## Day's End

At the end of the day D'Ignazio leads a lively discussion on how teachers can get started back in their own classrooms using a minimum of equipment.

"But that doesn't let you administrators off the hook," he says, talking to the principals, superintendents and school board members in the group. "Every school district can afford the \$8,000 it took to set up a TEC like this one. Business is very eager to help public schools improve their programs, and assisting in the setting up a state-of-the-art training center is a good start. It's up to you to persuade them of this."

"They even get an immediate pay-off," D'Ignazio continues, "because as soon as the center is set up in a local high school, trained teachers and students can begin offering evening courses to local-business employees. And the spin-off effect is invaluable to both sides." ■

# Wow! What Video Games Will Do Next

Amazing video games of the 1990s will allow you to 'star' in a TV show ... to change the plot as you watch it ... to visit any place in the universe ... to act out your wildest fantasies in the privacy of your home ... and to "move" objects with the power of your mind.

"These advances may even exceed our wildest expectations," declared Fred D'Ignazio, a top video and computer analyst.

"You'll be able to sit in front of your TV set 10 years from now and control the plot and outcome of your favorite shows.

"You will even be able to eliminate the face of one favorite character and substitute your own features so you will be participating in the show," he predicted.

Computerized video games of the 1990s will be able to pick up signals from your brain, turn them into electric impulses — and will give you the amazing power to "move" the objects on the screen merely by thinking about it, D'Ignazio said.

New kinds of video amusement parks will replace Disneyland-type parks, D'Ignazio predicts. They will have super-sophisticated games — in some rooms the walls and ceilings will be giant video screens.

"You will be able to take a personal voyage to other worlds and experience fabulous special effects that stimulate all your senses," he said. "The room will quake to the sound of rockets, laser guns and crashing meteors all around you."

Bernie DeKoven, a computer games creator from Palo Alto, Calif., predicts that people will be able to put themselves into films with their favorite stars.

"In some of the more advanced games, you will actually be able to participate in the fantasies," he said. "A woman could be pursued by a Robert Redford, while male players could successfully court their favorite

screen goddesses." And you'll even be able to act out situations to help you solve real-life problems, added DeKoven. "Say a guy wants to meet a girl but he is shy.

"His computer game will allow him to try out a number of different 'passes' without fear of rejection."

DeKoven foresees games that eliminate the drudgery from daily exercise, like a rowing machine hooked up to a TV monitor. "You could be rowing your way through the white-water rapids," he said.

John Vurich, a computer expert who heads his own company, Axlon Inc., in Sunnyvale, Calif., predicts that thousands of video games will be on the market, and you'll be able to sample them before buying.

— ART DWORKEN



**WANT TO HIT J.R.?** You'll be able to do it in the 1990s.

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# In the New A B C's,

By JAMIE TALAN

**W**HEN 3-year-old Sarah Hall of Danbury gets ready for a bedtime story, she sits in her mother's lap and reaches her tiny fingers across a big screen. With little prompting, she removes the "Sammy the Sea Serpent" cartridge from its jacket and places it into a computer cassette deck.

Sarah is one of thousands of American children being taught to use a computer — some at as early as 4 months old. Before they enter kindergarten, many will have learned the alphabet, counting, storytelling, directionality, logical sequencing and fine motor and sensory coordination. Moreover, they will be well along in being computer literate.

"Computers will be as common in our children's lives as television was when we grew up," said Sarah's mother, Laurie, director of marketing services for Program Design Inc., an educational software company in Greenwich. "Kids of the computer generation will be swapping software instead of bubble-gum cards."

While for many children the coloring book is being replaced by three-dimensional computer graphics, some educators remain wary of the computer revolution.

A private nursery school in Stamford turned down an offer of a free computer, Mrs. Hall said. "There is still a feeling among teachers that it is too soon for young children to learn computer language," she said.

Laura Bubbico, a teacher at the First United Methodist nursery school in Stamford, was recently hired by Program Design Inc. as a part-time consultant to test the use of educational programs in teaching young children.

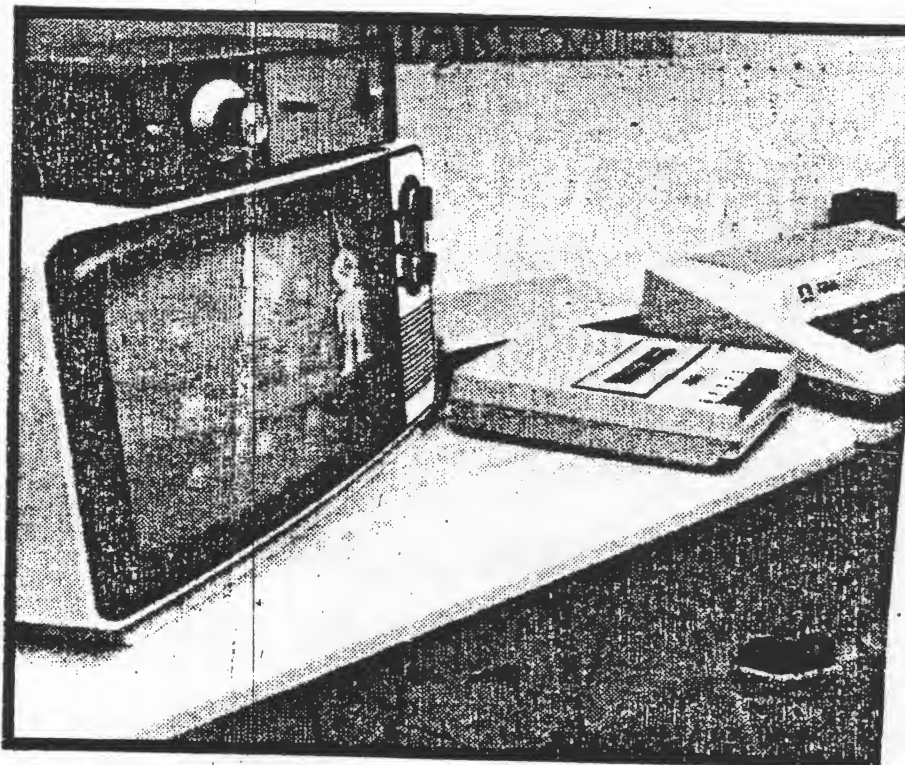
In the test, 20 children ages 3 and 4 were split into two groups. One group did computer games, and the other worked on counting and the alphabet.

After 15 half-hour sessions of letter and number matching, identifying shapes and participating in storytelling, the computer group showed "significant improvement in their skills," Mrs. Hall said.

Interactive learning, she added, is more fun for children than passive learning.

Steven Slade, assistant chairman of the computer science department at Yale, said that very young children, under 3, will be growing up with some sophistication in what computers can do.

His son, David, now 4, has been working with computers since he was 2.



"Kids just know more about life than their counterpart of the 1930's," said Mr. Slade. In September, David will enter the Calvin Hill School in New Haven, where kindergarten children will have access to a computer.

Many schools have one or more computers, but still students may only get as little as an hour a week of computer time, according to Tom Snyder of Tom Snyder Productions. He is a former fifth-grade teacher from Massachusetts who has turned his attentions to creating educational and fun software for children.

"Parents, not wanting their children to fall behind, are buying home computers," said Mr. Snyder. Some industry estimates are that home computer sales could reach \$8.5 billion this year, or 38 percent higher than last year.

Fred D'Ignazio, associate editor of Computer magazine and contributing editor of Inter, a Children's Television Workshop publication, said that "parents are pressured to jump on the bandwagon."

"They are certain that introducing their youngsters to high technology will guarantee them jobs in the future," he said. "In three to four years we will be moving toward the computer as a black-box machine. Instead of having an infinite variety of things to do, you'll have one or two buttons to push, just like a television or automobile. Children don't have to

know what goes on inside because that will change by the time they reach age 7."

Mr. D'Ignazio's advice is to "just turn the kids loose; they really do wonderfully without too much parental guidance."

At the Montessori School of Northwestern Connecticut in Northfield, each of the 88 pupils, from 2½ to 10 years old, spends time daily on a computer.

"Children can work independently and check their own mistakes," said Jean Van Dycke, the school's administrator.

This summer, Patience Boden, 9, has been allowed to take the computer home to work with.

Her mother, Candice, said, "The computer teaches her things she would not ordinarily have picked up a book to learn."

"It seems to have broadened her horizons," she said. "Patience has tackled French and algebra, and she doesn't feel there's anything she can't do."

Parental involvement is vitally important for computer learning, according to Paul Firstenberg, president of Children's Computer Workshop, a subsidiary of Children's Television Workshop.

"Machines don't generate the human warmth and understanding parents do," he said, and added that as adults become more familiar with computer language, the hardware



# Read Before You Buy

*Here's a Quick Guide to Good Books and Magazines That Will Help You Understand Personal Computers*

Those who think that personal computers will spell the end of the print industry ought to look again. The microcomputer revolution has triggered a boom in printed material on the subject as well. Bookstores, newsstands, and computer stores devote yards of shelf space to books to help you select, use, understand, and maybe even love your personal computer.

In fact, the bookstore probably should be the first stop for anyone considering buying a personal computer, and especially for those intimidated by the very thought. And it is often a regular stopping place for those who already own micros. Herewith, a guide for a do-it-yourself course in computer literacy. (Publishers' prices listed are for paperback editions.)

## Getting Started

For an entertaining and informative introduction to personal computing, two best sellers by Peter McWilliams—*The Personal Computer Book* and *The Word Processing Book* (Ballantine/Prelude Press, \$9.95 each)—are hard to beat. The author, a California poet and publisher who has discovered the convenience of microcomputers, employs a low-key, light-hearted approach to what can be a boring subject. For all his levity, McWilliams's explanations are clear, his observations well-reasoned.

*The Personal Computer Book* begins with "An Incomplete and No Doubt Inaccurate History of Personal Computers Including Some Basic Information on How They Work"; goes on to describe their use in business, education, and the home; and concludes with an even-handed, if sometimes brutal, assessment of many of the microcomputers on the market today.

In *The Word Processing Book*, McWilliams focuses on the most common use of microcomputers (after video games, perhaps): writing and editing. He provides chapters on word processing by office workers, students, writers, the self-employed, and yes, even poets. The reviews of microcomputer brands are even

Steven Frankel is a writer and consultant on consumer electronics.



PHOTOGRAPH BY MAHWOLD EL DARWISH

more opinionated here—he clearly favors business-oriented machines over more popular multipurpose systems such as IBM, Osborne, and Apple—but his assessments provide a sound starting point.

For the business person seeking to understand computer hardware and software, a good place to start is *The Howard W. Sams Crash Course in Microcomputers* by Louis Frenzel Jr. (Howard W. Sams, \$19.95). Between ten and twenty hours invested in this self-teaching text will yield an excellent overview for buying and using computers.

Writers and other literary types who relish "hard copy" and tend to distrust technology might benefit from *Writing with a Word Processor*, by William Zinsser (Harper & Row, \$5.95). The author of *On Writing Well* tells step-by-step how he learned to live with an IBM word processor—and to write better as a result.

Unlike many adults, kids seem to take naturally to computers. One of the best introductory books for kids is *Katte and the Computer*, by Fred D'Ignacio (*Creative Computing*, \$9.95), a beautifully illustrated and entertaining volume that gives children—and parents—a good understanding of how computers work.

Of as much literary as technological interest is Tracy Kidder's 1982 Pulitzer Prize-winning book, *The Soul of a New Machine* (Avon, \$3.95), the fascinating


story of how a small team of engineers built a radically improved computer in record time. Beyond the human drama that makes it compelling even to the technologically uninclined, this book provides remarkable insight into the real world of computer design and marketing, how computers work, and why they are having such a profound impact on our lives.

An equally intriguing but totally different book for the general reader is Dale Peterson's *Genesis II—Creation and Recreation with Computers* (Reston, \$18.95, hardcover), a lavishly illustrated coffee-table volume on the use of computers in art, poetry, music, and games.

## Programming

Becoming a successful microcomputer user doesn't require that you learn to program—that is, instruct the machine to do specific tasks without using pre-programmed software—but there are obvious benefits to doing so.

Seymour Papert, the author of *Mindstorms—Children, Computers, and Powerful Ideas* (Basic Books, \$6.95), believes that society has taught us to fear new concepts and technologies. He shows how, by using a computer language called LOGO, children can learn to explore the world of abstract ideas and mathematical concepts. This is something of a philosophical tract, but it also provides an excellent how-to approach to learning and teaching LOGO.

Henry Ledgard and Andrew Singer offer a novel approach to programming for the whole family in *Elementary BASIC—Learning to Program Your Computer in Basic with Sherlock Holmes* (Vintage, \$12.95). Instead of the mindless exercises most texts use to teach BASIC, the standard nontechnical computer language, the reader works with Holmes and Watson in programming their Analytical Engine to solve some of their most baffling cases. This new book offers the most entertaining and painless way yet to learn the BASIC syntax and commands. In a companion volume, the authors use the same approach to teach Pascal, the language used in many college-level computer-science courses. 

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For a more standard approach to learning BASIC, one of the best books is *Armchair BASIC*, by Annie and David Fox (Osborne-McGraw Hill, \$11.95). It offers an easy-to-follow textbook approach to programming in BASIC, with brief, clear examples and quizzes.

*The Computer Tutor—Learning Activities for Homes and Schools*, by Gary Orwig and William Hodges (Little, \$10.95), is primarily a children's textbook for learning BASIC. With an excellent collection of instructional programs, this is the text used in many computer camps.

### For Specialists

For the reader who has mastered BASIC, a number of books provide programs that can be typed in and customized to meet a variety of specialized needs. If you can handle the tedium of typing several hundred lines of coding, for example, *Executive Computing* by John Nevison (Addison/Wesley, \$9.95) provides excellent tools for sales forecasting, long-range planning, quantitative analysis, and the like; reading it and running the programs can provide more useful knowledge than a year of business school. If you like to play the market, *Computerized Stock Market Analysis*, by John Moundalexis (Dalex Publications, \$14.95), might provide the ideal rationale for joining the personal-computer revolution.

For those who copy programs from books and magazines, *The BASIC Handbook*, second edition, by David Lien (CompuSoft, \$19.95), is indispensable. This advanced reference work documents the BASIC commands and syntax used by different computers, allowing the user to modify a program written for a Radio Shack computer, for example, so it can be run on an Apple.

One of the most useful developments in microcomputers is the growth of database management systems—computer programs that let you organize and retrieve data in a myriad of ways. Robert Byers's *Everyman's Database Primer Featuring dBase II* (Reston, \$15) is a very readable book on the subject; although it focuses on the dBase II system, its contents are applicable to most of the data-base management systems currently used with micros.

### Magazines

The microcomputer industry has also spawned many magazines. Like books, many of the new publications are dedicated to specific uses, operating systems, and microcomputer brands; *IBM PC*, for example, is a magazine for owners of the popular IBM Personal Computer. The field is still dominated, however, by general-purpose microcomputer publica-

tions. All are available at computer stores and larger bookstores.

For Apple, Atari, and Commodore game-playing enthusiasts, *Creative Computing* (\$24.97 a year) is the best source of information and recreation, offering broad coverage of games software, including programs that users can copy and reviews of inexpensive hardware such as printers and computers selling for less than \$1,000. It also provides some of the best ongoing coverage of educational computing topics.

The biggest bargain, and probably the single best source of up-to-date information on the whole field of personal computing, is a weekly newspaper called *InfoWorld*. Focusing mainly on business uses of computers and emphasizing news over how-to articles, *InfoWorld* features new product announcements, trade gossip, five to ten software reviews per issue, and an occasional hardware review. A year's subscription costs \$25.

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### A number of books provide programs you can customize to meet your needs.

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Among the general-purpose monthly magazines, *Popular Computing* is one of the strongest on how-to articles. A typical issue will focus on a topic such as data communications, discussing how the process works and reviewing representative hardware and software. A few other product reviews, articles unrelated to the main topic, and a smattering of articles devoted to games and recreational micros are also included. A subscription is \$15 for twelve issues.

*Interface Age* (\$21 for twelve monthly issues) is targeted to business people interested in using micros in their work. Each issue is replete with hardware and software reviews, along with some programs that the reader can enter and use.

In a class by itself is *Byte*, which serves as the computer bazaar for the nation. With each issue running more than 500 pages, the ads alone are worth the price of \$21 for twelve issues. The magazine includes reviews and information on new computers and software products and a wide range of how-to articles.

Finally, looking to the future, a new monthly magazine called *Family Computing* is scheduled to debut in September. It is being designed to help families buy, understand, and use microcomputers for a variety of activities. If its quality is on a par with the other educational publications produced by its publisher, Scholastic Inc., *Family Computing* should be a welcome addition to the field. □

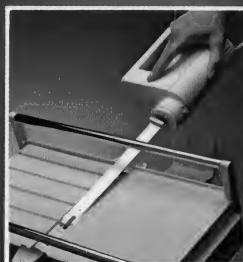
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sions normally reserved for more advanced courses. These include discussions of algorithm complexity and hash addressing, and programs with binary search trees and recursive merge sort procedures. There is even a discussion of the concept of the heuristic. I do not intend mention of this as a criticism; however, it does seem somewhat odd that the author would omit, as he states on page 24, "some of the features of Pascal that are occasionally useful." One of these is the record variant. The concerned instructor considering this text may want to search the text for others.

### CHIP MITCHELL: THE CASE OF THE STOLEN COMPUTER BRAINS

Fred D'Ignazio; New York: Lodestar (E.P. Dutton), 1983; 123 pp., \$8.95, hardcover.

Reviewed by:

Harriet Pitkof, Valley Stream, New York.

Of all the books that *Educational Computer* has sent me to review, *Chip Mitchell: The Case of the Stolen Computer Brains* took me the most time to do. Why? Not because it is a large book (only 123 pages); not because it is hard to read (it only took an hour); not because it was boring (I couldn't put it down). Why? Because I made the mistake of leaving it on my desk the day it came. One of my students saw it, started to read it, and had to take it home to finish it. Then he lent it to a friend who lent it to a friend, etc., and it wasn't until the last day of school (almost two months later) that the book was returned to me, albeit reluctantly, so I could read and review it.

Who is Chip Mitchell? He is a seventh grader who has, among other things, a computer at home that he uses to solve mysteries. Fred D'Ignazio has reached near perfection in involving the reader in the mystery and then, just when the solution is about to be revealed, the story stops and the reader is asked to solve the mystery. As I read the book I wondered how many of us will solve the mysteries before turning to the solutions in the back of the book.

Some of the cases that Chip Mitchell solves are: "The Case of the Cheating Computer," "The Case of the Stolen Computer Brains," "The Case of the Crooked Arcade Game," "The Case of the Killer Robot," and "The Case of the Electronic Bank Robbery."

My only criticism of this book is that it should be longer. I didn't want it to end and am looking forward to more Chip Mitchell stories. In the meantime, Chip Mitchell will be added to a large part of my holiday shopping list and I advise you to do the same. □

### NEW BOOKS

*Editor's Note:* The following list of new books is offered to show what is currently available; the descriptions are not reviews but are taken from the publishers promotional copy. If you are interested in reviewing any of the books for *Educational Computer*, contact the Book Review Editor, *Educational Computer*, 3199 De La Cruz Blvd., Santa Clara, CA 95050.

Ashley, Ruth, and Judi N. Fernandez, *PC DOS: Using the IBM PC Operating System*. New York: John Wiley & Sons, 1983. Paperback, 225 pp., \$14.95

Explains all the ins and outs of IBM's DOS, shows how to use it to perform routine work functions as well as sophisticated tasks with maximum flexibility and efficiency.

Castelwitz, David M., *The VisiCalc Program Made Easy*. Berkeley, CA: Osborne/McGraw-Hill, 1983. Paperback, 195 pp., \$12.95.

Step-by-step exercises for learning all the commands and functions of this spreadsheet program.

Cortesi, David E., *Your IBM Personal Computer: Use, Applications, and BASIC*. New York: Holt, Rinehart and Winston, 1982. Paperback, 253 pp., \$17.00.

Emphasizes practical things for the new PC user; exercises and practical advice.

Donnelly, Frank P., *Learn to Type on Your Computer*. New York: Dictation Disk, 1983. Comb binding, 33

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pp., \$10.00.

Written for those who would like to learn to type well in the shortest possible time.

Ferrari, Domenico, Giuseppe Serazzi, and Alessandro Zeigner, *Measurement and Tuning of Computer Systems*. Englewood Cliffs, NJ: Prentice-Hall, 1983. Hardcover, 523 pp., \$35.00.

Oriented toward the professional and the student, the book discusses measurement techniques and tools and their application to systems performance improvement studies.

Flast, Robert H., *54 VisiCalc Models*. Berkeley, CA: Osborne/McGraw-Hill, 1983. Paperback, 277 pp.

Models for managing investments, loans and taxes, and for solving statistical and mathematical problems that can be keyed directly into the computer.

Garetz, Mark, *Bits, Bytes and Buzzwords: Understanding Small Business Computers*. Beaverton, OR: dilithium Press, 1983. Paperback,

# COMPUTING for kids

## There's A Creature In My Computer!

### The Lobsters Under My Bed

When I was a kid I used to go to sleep at night with my hands pulled up inside the sleeves of my pajamas, and my feet tucked inside two layers of socks and a pair of slippers. I did this to hide my fingers and toes from the lobsters that lived under my bed.

These lobsters weren't just average creatures. First, they didn't need to live in water. Instead, they could somehow survive under my bed — along with lint, dust, dirty clothes, copies of *Mad* magazine, science fiction books, and potato chip crumbs.

Second, if they got hungry, they didn't look for regular lobster food. Instead, they liked to munch on crumpled, smelly socks. (There were lots of those under my bed.) But their favorite food was fingers and toes — *dirty* fingers and *dirty* toes.

I went to bed at night convinced that lobsters really did live under my bed. I was afraid that if I fell asleep and accidentally let my hand or foot slip over the side of the bed, one of the lobsters would leap out, pinch it off, gobble it up, and disappear back under the bed.

The lobsters had never been known to attack clean fingers and clean toes. But I never considered taking a bath. Instead, I bundled up my toes and fingers, and slept in bed all scrunched up like a sunburnt spider. If a lobster wanted to make a meal out of me, it was going to have to work for it.

I shared my bedroom with several lobsters. But we weren't alone. There was also a nightmarish creature who lived underneath my



dresser. He would come out from under the dresser when my mother turned out the hall light. He always hid in the shadows. In fact, he *was* a shadow. Real slithery, dark, and tricky. He was all body. No head.

And then there was the creature that lived in my closet behind my dress shirts and Sunday school pants. I called him the Closet Beast. He was one of those shy creatures. He only came out at night when I wanted nothing to do with him. During the day he probably killed time pretending to look like a bow tie or the pair of brown dress shoes I hated.

Between me and all the creatures, the bedroom was crowded. I wished that some of the bedroom creatures would move out. But if they had they would have bumped into the creatures in the other parts of the house. The worst of these was the Ghoul who lived in the cellar, underneath the stairs.

I hoped and prayed I would never meet the cellar Ghoul. But one night I came very close. It all happened because I was a sleepwalker. I was so bad that my mother had to bolt all the win-

dows each night before she went to bed. She was afraid I might climb out one of them and try to sleepwalk on the two-foot ledge that rimmed the roof.

Thanks to my mother I never did any sleepwalking on the roof. But I did sleepwalk a lot inside the house. And I sometimes ended up in some pretty strange places.

One night I woke up and immediately knew something wasn't right. I had my pillow and was wrapped up in my blanket like a mummy, but I wasn't in my bedroom any longer. I was someplace else, someplace very, very dark. And damp. And moldy smelling.

I rubbed my fingers on something hard underneath me. I realized I wasn't in bed. I was on a dusty concrete floor — the basement floor. And I was right next to the stairs where the Ghoul lived.

As dark as the basement was, the space under the stairs was even darker. I couldn't see anything, but I could sense that I was not alone. Something was there with me. And it was coming closer.

I screamed. I screamed again. And again.

I woke up the whole house with my screaming. Moments later, the basement light came on. My parents came flying down the stairs and found me huddled under my blanket, wailing like a ninny.

When they dug my head out of the covers, I pointed toward the stairs. My parents investigated. They didn't catch the Ghoul. But, they did find, hiding under the stairs, a very scared kitty cat.

## There's A Creature In My Computer!

I used to see creatures in every shadow or dark corner of my life. I saw so many creatures because I had a crazy imagination.

How about you? Do you have a crazy imagination like mine? Do you see ghosts in wisps of smoke? Do you see sleeping giants inside craggy mountains? Do you see fang-toothed monsters staring up at you out of gutters and hollow stumps of trees? Have you seen the skinny creature who lives inside your medicine cabinet — the one that feasts on stale toothpaste?

With a little imagination you can see creatures everywhere. And, with a little imagination, you can create a creature inside your computer. The creature (he, she, or *it*) might even be living there now. You just have to bring it to life.

## The Ghosts In The Machine

Your computer is a perfect place for a creature to live. After all, it's already full of ghosts. The ghosts are other people's programs.

Some people think that programs are just abstract lists full of information and commands. These people are wrong. A program is — or can be — much, much more.

Every program that is written has a personality. Most computer programs written in the past had dull personalities. But they don't have to be dull.

Where does a program's personality come from? It comes from its creator, the person who thought it up and typed the commands into the computer.

The program is a reflection of its creator's imagination.

If the person has a dumpy, dull sort of imagination, then the program will be dull. It might have the personality of a stuffed shirt or toad. Most business programs have toady personalities.

On the other hand, if the person's imagination is creative, weird, and funny, then the program will be creative, weird, and funny, too. (Does this remind you of a few game programs



you have played?)

Programs are the ghosts inside your computer. So why not turn them into real ghosts, goblins, ogres, zombies, dragons, and other creatures? You can take the creatures that live inside your imagination and load them into your computer. To create the creatures you just write a program. To bring them to life you just type RUN.

## Turn On Your Imagination

**Warning:** If your imagination is having a bad day, you'd better stop here and wait. The creature we're going to create this month is 99 percent imagination and only 1 percent program. The creature is simple, but it can still seem real — if you use your imagination.

## A Simple Creature

Turn on your computer and type:

20 PRINT "GRRRR!!!" [Press the RETURN key.]

You have just created a creature inside your computer. You don't know what it looks like. You don't know if it wears a ski cap and orange polka-dotted socks, or how many warts are on its nose. But you do know two things: it's there and it's not very friendly.

To see if I'm right, type RUN (and press RETURN). What does the creature do? It says:

GRRRR!!

Not too friendly, is it?

What happens if you add a new line to the creature's program? For example, type:

30 GOTO 20

Now type RUN. What happens? This time you see:

GRRRR!!  
GRRRR!!  
GRRRR!!  
GRRRR!!  
GRRRR!!  
GRRRR!!  
GRRRR!!

Now you've created a creature that is *really* unfriendly! (To stop the creature from growling, press the RUN/STOP key.)

So far, the only way to get your creature's attention is to type RUN. But you might want to say something to the creature. To do this you have to teach the creature to *listen*. To make it listen, type:

10 INPUT A\$

Change line 30 to say GOTO 10. Your whole program now looks like this:

10 INPUT A\$  
20 PRINT "GRRRR!!!"  
30 GOTO 10

Type RUN.

The program begins running, and the creature wakes up. He is looking at you. He is waiting for you to say something. (The computer has printed a "?" on the display screen. Imagine that the creature is sprawled in a dungeon inside the computer. He is just waking up. He looks dazed, and has a big "?" over his head.)

This is your first chance to say something to the creature. In fact, he won't make a move until you say something.

But what do you say to a creature?

You can try insulting him by saying something like:

YOUR FEET SMELL!

Or you might try giving him a command like:

DON'T EAT ME!

Or, you can try to be friendly and ask the creature a question, such as:

DO YOU LIKE PIZZA?

Think up a message, type the message, then type RETURN. What is the creature's answer? He says:

GRRRR!!

He says "GRRRR!!!" because it's the only thing he knows how to say. He's a very dumb creature. No matter what you tell him, he always growls. He's a real grump.

To make him say something else, you have to teach him. What sort of new things can you teach your creature to say? What sort of things can you teach your creature to do?

## Next Time: New Creatures

This time we created a very simple creature. Next time we'll see how we can create a creature that surprises you. He'll make scary creature sounds. And he'll have a creature face.

I'll help you build creatures and turn them loose on other members of your family. But I'd really like to see what creature you can come up with on your own.

Write a short program and make a creature. Then, no matter how crazy the creature is, send it to me. Send it to:

Fred D'Ignazio  
2117 Carter Road, SW  
Roanoke, VA 24015

Dream up strange, funny, and unusual creatures, then turn them into programs and send them to me. I'll print the best programs in this column.

Be like a magician pulling rabbits out of a hat. Pull the creatures out of your imagination. Then pop them in the computer and bring them to life.

You can send me any kind of creature at all.

Except for just one kind.

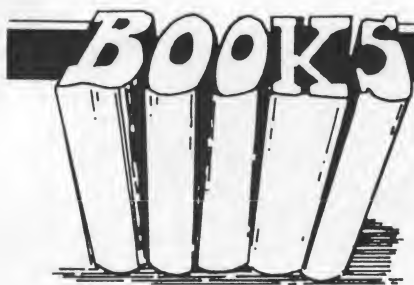
Don't send any lobsters. 🦞

School Library Journal

D'IGNAZIO, Fred. *Messner's Introduction to the Computer*. 286p. illus. photogs. glossary. index. CIP.

Messner. May 1983. PLB \$10.29.  
ISBN 0-671-42267-7. LC 82-42881.

Gr 6 Up—The author's focus is on the inventors, from Charles Babbage, a 19th-Century British mathematician who designed the first modern computer, to Steve Wozniak and Steve Jobs of Apple—their personalities and just what drove them to create as they did. Intriguing chapter headings (i.e., "Dinosaurs, Bugs, and Exploding Pickles") and timely examples such as *Tron* and the "Star Wars" series are used effectively to hold readers' attention; then D'Ignazio effortlessly lures readers toward present and future endeavors (i.e., computers and the handicapped, robots, graphics). An enthusiastic and entertaining look at the evolution of the computer with projections as to where the industry is heading.—Naomi J. Rhodes, *Buffalo & Erie County Pub. Lib., Buffalo, N.Y.*



by Elizabeth S. Wall

### **Microcomputers Can Be Kidstuff: A Friendly Guide To Using a Micro in Your Home and School**

Anna Mae Walsh Burke  
Hayden Book Company, Inc.  
50 Essex Street, Rochelle Park,  
N.J., 07662. 1983, \$8.95

General computer career books are always welcome in a classroom or school library and this one is a good one to have. The fact is that the youth of today will use microcomputers daily in their college studies and careers. Yet how many kids are thinking that far in the future when they're blasting space ships in arcades or zapping spelling words on a CAI disk? Not many . . . but the author points out that knowledge about and expertise with these machines will come in handy in the academic and business worlds when it's time to earn a living.

Burke writes from the viewpoint that computers are interesting, exciting and special. Her target user group is young people in high school and college. Chapter headings like "Computers Are Everywhere," "What Is a Computer?", "What Kinds of Things Can Computers Do?", "What Do You Do First?" and "What Do You Say to a Computer?" reveal the author's easy style and the scope of the book.

Manufacturer-supplied photographs and line drawings are captioned and carefully placed to illustrate different kinds of hardware from microcomputers to mini-computers. Also important to students and teachers are the chapters explaining BASIC and Pilot.

Of course, not all of your students will want to be computer specialists, but this book enables the average young adult to learn how to use computers productively

from games to problem solving. A dictionary of computerese and an index complete this useful book.

### **The Beginner's Guide to Computers**

Robin Bradbeer, Peter DeBono and Peter Laurie  
Addison-Wesley, Reading,  
Ma., 01867. 1983, \$9.95 paper.

The authors of this book, which is based on a popular BBC series "The Computer Programme," are all educators in the United Kingdom. Their ideas should appeal to the education community in the U.S. because they deal with some of the confusion and apprehension teachers and administrators universally encounter about computers. They address the "millions of people who feel threatened by computer technology, baffled by bytes, confused by kilobauds and curious about what computers can (and can't) do."

The book contains a brief history of computing and goes on to tell how and why computers function, how to do simple programming and problem solving and how computer technology is applied to real-life situations "from piano tuning and electronic games to fine art."

Helpful captions explain the many photographs, charts and drawings which complement the simple and straightforward introduction. Examples of real-life problems demonstrate how the computer can be used in the problem solving process. Some of these real-life problems, however, are more common for the British. Others, such as creating a year's schedule for a football league and regulating conditions in a greenhouse, are definitely useful to American readers as well.

A glossary explains the most widely used computer terms and an index serves as a handy reference tool. The book is already a best

seller in Britain because it makes computing not only accessible for beginners, but enjoyable as well.

### **Messner's Introduction to the Computer**

Fred D'Ignazio and  
Julian Messner  
Simon & Schuster, Inc.,  
1230 Avenue of the Americas,  
New York, N.Y., 10020.  
1983, \$12.50

*Messner's Introduction to the Computer* would be more aptly titled "Fred D'Ignazio's Introduction to the Computer." In a clear, lively style, the author unfolds the amazing capabilities of our modern computers to young readers ages ten and up.

The first three chapters of this book include, "For Just 25 Cents You Can Save the Earth," "The Game Wizards" and "Engines to Make Numbers Fly." With limitless enthusiasm, the author takes the reader down winding, unmarked trails to discover frontiers where computers are found helping the handicapped, performing dangerous missions under the sea, working in factories alongside people, working on oil platforms in the sea and guiding space ships.

Beginning with Chapter IV, "Architects of the Micro World," the rest of the book tells the stories of the men and women computer pioneers and their modern counterparts. Beginning with Charles Babbage and the Difference Engine and ending with John Whitney, the expert in making movies, D'Ignazio tells us about creative artists, musicians, engineers, writers and movie makers who discover ways to do things better using computers.

*Messner's Introduction to the Computer* is interesting and imaginative, a real page turner. It's just the right book to turn on young readers. I hope Fred D'Ignazio will keep writing for children for a long time.

health care administration. In 1974 he was named president and chief executive officer of American Medical International, Incorporated. He wrote *How to Finance Your Growing Business* (Prentice-Hall, 1981). Address: 414 North Camden Dr., Beverly Hills, Calif. 90210. *Biographical/critical sources*: *Who's Who in America*, 40th edition, Marquis, 1978.

\* \* \*

### DIETZ, Howard 1896-1983

**OBITUARY NOTICE**—See index for CA sketch: Born September 8 (one source says September 9), 1896, in New York, N.Y.; died of Parkinson's disease, July 30, 1983, in New York, N.Y. Publicity director, lyricist, and author. Dietz wrote the lyrics for more than five hundred songs, including such perennial favorites as "Dancing in the Dark," "That's Entertainment," and "You and the Night and the Music." Though most of his songs were written in collaboration with Arthur Schwartz, the lyricist also provided words for works by such composers as George Gershwin, Jerome Kern, and Vernon Duke. In addition to his songwriting activities, Dietz worked as publicity director for Metro-Goldwyn-Mayer (MGM) during most of his career. While a young man he devised the familiar MGM lion trademark that is still used by the company. Dietz was also an avid card player, and he invented the two-handed bridge game that bears his name. He served as a director of the American Society of Composers, Authors, and Publishers (ASCAP) and was the first recipient of the society's Richard Rodgers Award. Dietz's autobiography, *Dancing in the Dark: Words by Howard Dietz*, was published in 1974. Obituaries and other sources: *New York Times*, August 1, 1983; *Chicago Tribune*, August 2, 1983; *Washington Post*, August 2, 1983; *London Times*, August 11, 1983; *Time*, August 15, 1983; *Rolling Stone*, September 15, 1983.

\* \* \*

### D'IGNAZIO, Fred(erick) 1949-

**PERSONAL**: Surname is pronounced Dig-nay-zee-oh; born January 6, 1949, in Bryn Mawr, Pa.; son of Silvio Frederick, Jr. (a restaurateur) and Elizabeth (McComas) D'Ignazio; married Janet Letts (an urban transit systems manager), September 5, 1969; children: Catherine Shum, Frederick Letts. **Education**: Brown University, B.A., 1970; Tufts University, M.A., 1971; attended American University, Washington School of Law, 1971-72; graduate study at University of North Carolina at Chapel Hill, 1975—. **Home and office**: 2117 Carter Rd. S.W., Roanoke, Va. 24015. **Agent**: Steven J. Axelrod, Axelrod Agency, 126 Fifth Ave., New York, N.Y. 10011.

**CAREER**: Analyst for Management Systems Corp., 1973; *The Futurist*, Washington, D.C., assistant editor, 1973-74; Computer Sciences Corp., Washington, D.C., systems analyst and programmer, 1974-76; University of North Carolina at Chapel Hill, assistant director of SENIC Project (a major hospital study for biostatistics department), 1976-77; writer, 1978—. Program director for The Institute, 1971-74. Instructor in computer courses in primary and secondary schools and in adult continuing education courses, 1974—. Analyst for John Hamburg & Associates, 1976-77. Member of educational advisory board of Terrapin, Inc., 1981—; member of advisory board of Tar Heel Computer Camp, 1982—.

Panelist on television programs "Profiles in Computer Education" and "Home Learning: Using Computers," Public Broadcasting Service (PBS), 1983; interviewed on "All Things

Considered," National Public Radio, 1982, and CBS Radio Network, 1983; appears weekly on "Good Morning, America," American Broadcasting Companies, Inc. (ABC-TV), 1983—. Member of Children's Fantasy Panel at World Fantasy Convention, 1983. Public speaker on educational computing in the classroom and the home, careers in computing, and computers in the schools. Consultant to Children's Television Workshop, *Consumer Guide*, Enter, Tomy Corp. (toy, computer, and robot manufacturer), Acorn Computers Corp., and E. P. Dutton's Electronic Publishing Division. Adviser to British Government on robotics curriculum in English schools. Lecturer at International Robotics literacy course, London, England, 1983. **Awards, honors**: Fellowship to Brazil from Brazilian International Relations Institute, 1970; fellowship to Portugal from Gulbenkian Foundation, 1971; grant from National Science Foundation, 1974.

**WRITINGS**—For children: "The World Inside the Computer" series, Creative Computing, Volume I: *Katie and the Computer* (North Carolina Book Club selection), illustrations by Stan Gilliam, 1979, Volume II: *The Computer Parade*, 1983, Volume III: *Kidnapped by a Computer Bug!*, 1984; *The Creative Kid's Guide to Home Computers: Super Games and Projects to Do With Your Home Computer*, Doubleday, 1981; *Small Computers: Exploring Their Technology and Future*, F. Watts, 1981; *Working Robots*, Elsevier-Dutton, 1982; *Electronic Games*, F. Watts, 1982; *The New Astronomy: Exploring the Secrets of Space*, F. Watts, 1982; (with Helicon Software Co.) *Chip Mitchell: The Goblin Burglar and Other Mysteries* (computer disk; solve-it-yourself interactive computer mystery adventure games), Dutton, 1983; *Chip Mitchell Solve-It-Yourself Computer Mysteries*, Lodestar Books, Volume I: *The Case of the Stolen Computer Brains*, 1983, Volume II: *The Case of the Robot Warriors*, 1983, Volume III: *The Case of the Chocolate-Covered Bugs*, 1984.

*The Star Wars Question and Answer Book About Computers*, Random House, 1983; *Messner's Introduction to the Computer* (textbook), Messner, 1983; *Invent Your Own Computer Games*, F. Watts, 1983; *There's a Creature in Your Atari*, Compute! Publications, 1983; *Science of Artificial Intelligence*, F. Watts, 1983.

For adults: *Computing With Little Kids*, Compute! Publications, 1983; *How to Get Intimate With Your Computer: A Ten-Step Program for Relieving Computer Anxiety*, McGraw, 1983; *Put Your Computer to Work: Building Creative Family Tools From Scratch*, McGraw/BYTE Books, 1983.

Computer instructional guides; all published by Hayden: *Atari in Wonderland*, 1983; *Atari Playground*, 1983; *Commodore 64 in Wonderland*, 1983; *Commodore 64 Playground*, 1983; *TI in Wonderland*, 1983; *TI Playground*, 1983; *VIC in Wonderland*, 1983; *VIC Playground*, 1983; *Apple in Wonderland*, 1984; *Apple Playground*, 1984.

(Contributor) Steve Ditten, editor, *The Digital Deli*, Workman Publishing, 1984. Also author of thirty sixty-second cartoons about computers and robots for children, broadcast on ABC-TV, 1983—.

Associate editor of *Compute!*, 1982—, and of *Compute!'s Gazette*, 1983—; contributing editor of *Turtle News*, 1981-83, and *Enter*, 1983—; columnist for *Softside*, *Compute!*, and *Turtle News*; contributor to *PC World*, *Enter*, and *Highlights for Children*; contributor of reviews to *Washington Post Book World*, *AAAS Science Books and Films* and *Science Fiction and Fantasy Book Review*; contributor to periodicals, including *Com-*

puters and Video Games and London Times Education Supplement.

**WORK IN PROGRESS:** "Electronic Katie and the Computer," a series "for young children (preschool to grade 3)."

**SIDELIGHTS:** Fred D'Ignazio told CA: "I love kids, books, fantasy, robots, and computers, and I love to put them all together in a bubbling stew. I have eighteen computers set up in my house, and I run a free, informal computer games arcade and programming lab for neighborhood kids. I also have a lending library for local kids to borrow books—books are everywhere. Little robots run around on the floor of my home, firing laser cannons, turning somersaults, talking ('my best wishes to everybody!'), and beeping (a little robot turtle). Dragons are everywhere—on the radiator and tucked in among the books. In my presentations I take kids on an imaginary voyage to the microscopic world inside the computer."

"I speak at day-care facilities, schools, conventions, computer camps, and on radio and TV about computer careers and about getting kids started computing and building robots. Computers are not just glorified adding machines. They are the most important new medium for human communication and imaginative expression. You can use them to invent electronic stories, words, pictures, movies, music, etc. Kids and adults need to become computer literate. Like any technology, computers can do much harm as well as great good. The more everyone knows about them, the better."

**BIOGRAPHICAL/CRITICAL SOURCES:** *Delaware County Daily Times*, January 15, 1980; *Daily Tar Heel*, January 24, 1980; *Chapel Hill Newspaper*, January 24, 1980, March 8, 1981; *Winston-Salem Journal*, October 18, 1981; *News and Observer*, March 9, 1982; *Durham Sun*, March 12, 1982; *USA Today*, August 1, 1983; *Roanoke Times & World-News*, October 11, 1983.

\* \* \*

#### DILLMAN, David D. 1900(?)–1983

**OBITUARY NOTICE:** Born c. 1900; died July 10, 1983, in Evanston, Ill. Public relations executive, economist, and financial writer. Trained as an economist, Dillman worked for such firms as the Union Trust Company and the Adams State Bank and as educational director of the Investment Bankers Association. From 1934 to 1936 he was an economist for *Business Week*, and at various times he served the *Chicago Journal of Commerce* in the capacities of financial editor, statistical manager, and managing editor. In 1950 Dillman joined Inland Steel, eventually becoming director of public relations. He retired in 1965. Obituaries and other sources: *Chicago Tribune*, July 13, 1983.

\* \* \*

#### DILLON, Barbara 1927–

**PERSONAL:** Born September 2, 1927, in Montclair, N.J.; daughter of George Rudolph (a sugar broker) and Janet (Quin) Dinkel; married Harold C. Dillon (an account executive for International Business Machines Corp.), 1952; children: Lisa Dillon Tullis, Brook, Nina. **Education:** Brown University, B.A., 1949. **Home:** 29 Harbor Rd., Darien, Conn. 06820.

**CAREER:** *New Yorker*, New York, N.Y., editorial assistant, 1949–57; writer, 1978—. Volunteer teacher at Mountaintop Day Care Center.

**WRITINGS—Children's books:** *The Good-Guy Cake*, Morrow, 1980; *The Beast in the Bed*, Morrow, 1981; *Who Needs a Bear?*, Morrow, 1981; *What's Happened to Harry?*, Morrow, 1982; *The Teddy Bear Tree*, Morrow, 1982.

**WORK IN PROGRESS:** Two children's books, *The Disappearance of Danny Dinkel* and *The Kingswood Key Caper*, for Morrow.

**SIDELIGHTS:** Barbara Dillon commented: "I always thought I might one day attempt juvenile fiction, though when my own three girls were small I had neither the time nor the psychological need to do so. It was only as they grew up that I felt a real desire to return to the world of children's books in which I had dwelt so happily with my children for so many years. My own childhood memories are, for some reason, most vivid at the third and fourth grade level, so it was to this age group that I naturally gravitated."

"Writing is, as the author Colette said, 'a difficult metier.' But once one is hooked on it, there is no turning back. The shape and color of my day usually hinge on how well my work has gone that morning. Letters from young readers are a particular source of pleasure to me, and I shall keep writing for them till I've used up every idea in my head."

\* \* \*

#### DILORENZO, Ronald Eugene 1931–

**BRIEF ENTRY:** Born November 16, 1931, in New York, N.Y. American educator and author. DiLorenzo began teaching college-level English in 1962 and in 1969 joined the faculty at St. Louis University. He edited *Three Burlesque Plays of Thomas Duffett: The Empress of Morocco; The Mock-Tempest; Psyche Debauch'd* (University of Iowa Press, 1972). **Address:** Department of English, St. Louis University, School of Arts and Sciences, 221 North Grand Blvd., St. Louis, Mo. 63103.

\* \* \*

#### DINER, Steven J(ay) 1944–

**PERSONAL:** Born December 14, 1944, in New York, N.Y.; son of Dave (a garment worker) and Helen (a garment worker; maiden name, Fenster) Diner; married Hasia R. Schuartman (a writer and historian); children: Shira Miriam, Eli Moshe. **Education:** State University of New York at Binghamton, B.A., 1966, M.A., 1968; University of Chicago, Ph.D., 1972. **Home:** 3825 Veazey St. N.W., Washington, D.C. 20016. **Office:** Department of Urban Studies, University of the District of Columbia, 4200 Connecticut Ave. N.W., Building 41, Room 502-16, Washington, D.C. 20008.

**CAREER:** University of Chicago, Chicago, Ill., instructor in Metropolitan Institute, 1970–72; University of the District of Columbia, Washington, D.C., assistant professor, 1972–76, associate professor, 1976–81, professor of urban studies, 1981—, chairperson of department. Guest on television programs; public speaker. Lecturer in American studies at University of Maryland, 1975; American Council on Education fellow in academic administration at George Mason University, 1983–84. President of North Cleveland Park Citizens Association, 1980–81, and Phoebe Hearst Elementary School PTA, 1981—; member of executive board of American Jewish Committee, 1981—, co-chairman of its domestic affairs committee, 1982—; member of executive board of Jewish Community Council of Greater Washington, 1983—; member of District of Columbia Community Humanities Council, 1983—. Consultant to Ed-

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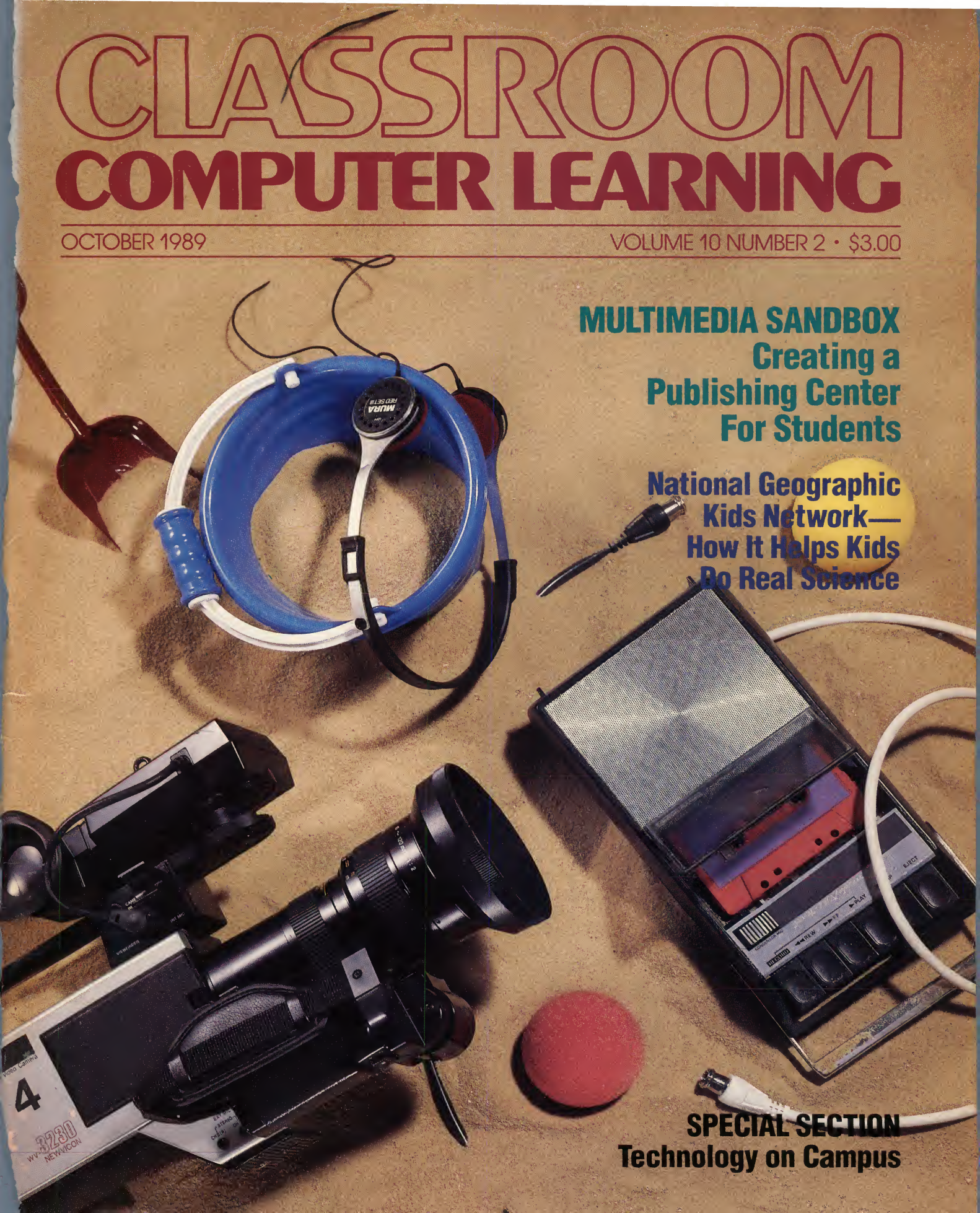
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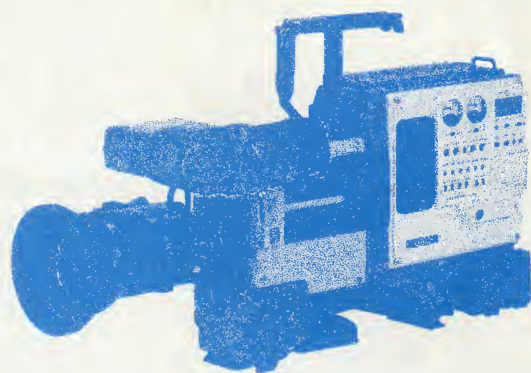
**MULTIMEDIA SANDBOX**  
Creating a  
Publishing Center  
For Students

**National Geographic  
Kids Network—  
How It Helps Kids  
Do Real Science**

**SPECIAL SECTION**  
Technology on Campus



# The Multimedia Sandbox: Creating a Publishing Center for Students



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It doesn't take big bucks for your students to become multimedia producers. By scavenging equipment from around the school and community, you and your class can invent a high-tech publishing studio on a low-tech budget. (Part I of 2)

---

By Fred D'Ignazio

**I**magine a classroom in which students take on the role of multimedia authors—creating radio shows, movies, books, magazines, advertisements, and slide shows about fractions, prefixes, Spanish verbs, Helen Keller, or any of a variety of other curriculum topics. Imagine productions so fresh and unusual that they are shown to the entire class, to other classes, to the PTA and the local school board; or displayed (and catalogued) in the school library and aired on local cable TV. And, if that doesn't move you, imagine a setting in which the technology involved in such productions—those finicky, malfunctioning machines that seem perversely designed to drive teachers into premature retirement—is managed primarily by students themselves.

Sound unreal? It's not. What you are imagining is a *multimedia classroom*, and teachers in Birmingham, Alabama; Oakland County, Michigan; Blue Earth, Minnesota; Cupertino, California; Nashville, Tennessee; Toms River, New Jersey; and elsewhere have already created such classrooms in their schools.

Multimedia has become a hot new topic in educational technology circles. But if all you think about when you hear the term "multimedia" are the new commercial programs that incorporate computer software with videodiscs (see "Interactive Multimedia: The Next Wave," *Classroom Computer Learning*; September 1989, p. 56), you ought to think again. Some teachers are taking a different approach to multimedia: They are placing the technology in the hands of the *students* and allowing *them* to take on the active role of



Photos from top to bottom:  
Students work together to create a desktop video about how volcanoes explode. The camera operator, the narrator, the sound effects person, and the computer artists must coordinate their efforts to create a final product.

As they prepare a science documentary on reptiles, teachers and students use a "boom box," computer, library books, video camera, VCR, and TV.

Students can make a multimedia presentation about any subject in the curriculum. Multimedia projects help students develop their oral and written communication skills and their self-esteem.



multimedia producers.

The resulting sense of pride among student authors is amazing. It is one thing to "publish" for your teacher's work folder or your family's refrigerator door. It is something else again if your "publication" is an electronic slide show that the administration displays in the school office, or a book that the school librarian reads to young children, or a movie that the kindergarten teacher shows to incoming parents and children on orientation day.

### Better Low-Tech Than No-Tech

"Sounds great," you may be thinking, "but we can't afford it." Perhaps you've had fantasies in the past about becoming a "cutting-edge teacher"—until you



(continued on page 26)

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## Multimedia Sandbox

(continued from page 23)

looked at the resources available in your school. You may be a daring soul who would love to experiment with the newest technologies (desktop publishing, desktop presentation tools, telecommunications, desktop video, hypermedia, and so forth), but the only equipment at your disposal is a 64K computer, a printer, a cobwebby tape recorder, and a VCR and TV, which, from their Victorian styling, appear to be at least a hundred years old.

Take heart. Dozens of teachers are experiencing success with multimedia technologies in schools with scarce resources and skimpy budgets. Their motto: "Scavenge, improvise, and trust." Teachers and students scrounge multimedia resources from around the school, from members of the local business community, and from students' homes; and with it they assemble a publishing center—a sort of multimedia sandbox—where student authors and producers can create publications and presentations about topics they are studying in the curriculum.

Why not try using this *scavenged multimedia* approach to assemble a multimedia center for your school? After all, the secret to being a cutting-edge teacher is not in the megabucks of hardware you use in your classroom, but in the ingenious ways you use the hardware to get kids to learn.

### Creating a Publishing Center

There is no blueprint for building a multimedia publishing center. Since



**As part of a math activity on place value, children count chips, choose musical notes to represent each number, and type big graphic numbers on the computer keyboard. The teacher keeps track of the numbers' place value on the chalkboard, and a student creates a "how-to" video to show other classes how to re-create the activity.**

## Great Ideas for

Here are just a few of the exciting multimedia projects that students and teachers around the country have completed:

- A fourth-grade class at West Elementary School in Vestavia Hills, Alabama, produced a weekly "Science Radio" show. The program offered current-events tidbits, tutorials on the weather, math brain twisters, a listener "call-in" segment, and more. Although the resulting program was not actually broadcast over the airwaves, it was a big hit within the classroom where it was "aired" with the help of a tape player. At the end of the year, the students took a field trip to a local radio station and had the opportunity to collaborate with the station's disc jockeys on a program that was broadcast to local radio listeners.

- A kindergarten teacher at Cahaba Heights Community School in Birmingham, Alabama, took a small "mini-cam" crew of student producers to a pumpkin patch. The students shot a video of their Halloween pumpkin growing on the vine, being cut, and being hauled back to the classroom. The class then cut open the pumpkin, took out the seeds, and created a jack-o'-lantern, videotaping each step and showing how the pumpkin could be integrated into math activities, including counting, estimation, measuring, place value, and graphing. The students showed the video to other classes and the teacher showed it at inservice workshops.

- A sixth-grade class at the same school created a video yearbook out of segments shot by students at important events during the school year. The class sold dozens of tapes and made enough money to buy new multimedia equipment.

- Another project at Cahaba Heights Community School involved a class of sixth-graders who were studying the environment, toxic waste, and pollutants. The students hiked along a river bank near the school and gathered data. They published their findings in several media, including books, videotapes, and audio recordings, and mailed the resulting projects to local members of Congress and TV stations. The students also made presentations to their parents, to the school board, and to the PTA.

- Middle-school students at Royal Oak Schools in Royal Oak, Michigan, interviewed their classmates on video, asking them what they remembered about Dr. Martin Luther King. The students then developed a printed, video, and slide-show publication on King's accomplishments and his place in American history.

- In Gardendale, Alabama, a class at the Gardendale Elementary School sent a crew of student reporters around the state to research state history and geography. The student reporters were equipped with a tape recorder, a video camera, a Polaroid camera, notebooks, and pencils. The entire class then reviewed all the images, sounds, words, and pictures that had been collected and

# Multimedia Projects

assembled them into lessons which they published and shared with other classes and the school PTA.

- A fifth-grade science class at Blue Earth Elementary School in Blue Earth, Minnesota, shot video segments about their community during different seasons in the year. Then they spliced the segments together to show the effect of weather and climate on plants, animals, buildings, and human beings.

- Third-graders at Hewitt Elementary School in Trussville, Alabama, created a video called "The Last Warriors" based on native American folk tales and myths. The class designed backdrops and props using a computerized paint program and then videotaped popsicle-stick characters acting out the story in front of the computer backgrounds.

- Other third-graders at Hewitt Elementary took a trip to the zoo, where they took notes about the animals they saw, videotaped them, and recorded animal sounds. When they returned, the students digitized the animal images on the computer and added descriptive captions and animal sounds. The young authors then created an electronic slide show which categorized the animals by distinguishing characteristics (mammals, fish, large animals, small animals, plant eaters, etc.). They also published an "alphabet book" which was used by the kindergarten class to learn their letters.

- Sixth-graders at Shades Mountain Community School in Birmingham, Alabama, took on the role of political candidates and conducted campaigns for which they created TV and radio commercials promoting their candidacy. They also published promotional flyers, political newsletters, and booklets.

- A teacher at Hope Middle School in Holt, Michigan, created an animated slide show which served as an "electronic flyer" at the school's science fair. The slide show described the science fair's rules, criteria for judging, and entry categories. It was exhibited just inside the front door of the school where everyone could see it.

- As part of a unit on critical thinking, three middle school teachers at the same school created a videotape on decision making. They visited a fire station, interviewed a fire captain and several fire fighters, and added scenes from actual fire emergencies. They then used a graphics program to create several "question" screens which focused students' attention on the key decisions fire fighters have to make when faced with a real fire. When the tape was shown to students, the teachers paused the tape frequently and engaged students in discussion relating to critical thinking strategies employed in fire fighting.

- A fifth-grader at Southminster Elementary School in Vestavia Hills, Alabama, created an animated movie of a black hole in outer space. The project earned her first place in the school's science

fair. She wrote the script for the movie using a word processor, designed the animation with a computer-based graphics program, and filmed the results with a video camera while she was reading the script aloud and playing the sound track from the movie *Jaws* on a tape recorder.

- At ACOT (Apple Classroom of Tomorrow) sites in Memphis, Tennessee, and Blue Earth, Minnesota, students digitized images of themselves and sent them over the telephone line to other students in distant schools. Students then acted as "foreign correspondents" for the other schools covering news about their community, region, state, and country. They exchanged digitized photos and published them in student newspapers, term papers, and video documentaries.

- A popular multimedia project with the elementary and middle-grade students at the Toms River Regional Schools in Toms River, New Jersey, has been the creation of "video storybooks." First, each student used a software program with graphics and text features to create a story. Additional computer graphics were generated to introduce the story using a graphics or video titling program. Then, with the help of a "genlock" device (also known as a video overlay card), a computer-generated byline was superimposed over a live camera shot of each student. This was followed by the student's story, read by the student, with background music dubbed in. The process was then repeated for each class member. The resulting 15-minute "storybook" was aired on the school's closed-circuit TV and broadcast to the community on cable through the district's television studio.

- A fourth-grade student at Marble Elementary in East Lansing, Michigan, collected images of whales from videodiscs, videotapes, magazines, and books. He found whale sounds on a record from National Geographic, and stories about whales in *Reader's Digest*, in a whale watcher's handbook, and in the encyclopedia. The student then created and presented to his classmates an "electronic field trip" to the whales' habitat.

- To culminate a unit on business, special education students at Garfield Middle School in Albuquerque, New Mexico, produce videotapes for others in the school. The students apply for and are given jobs as film crew members, interviewers, researchers, graphic artists, script writers, technicians, editors, narrators, and ad writers. Each team then researches a particular business, visits relevant work sites, and produces a videotape to teach fellow students how the business works.

- Seniors in the world studies classes at Forest Hills Central High School in Grand Rapids, Michigan, have been using telecommunications programs, computer databases, and print resources from around the world to create multimedia presentations on global issues. The presentations take the form of videotapes, slide shows with (audio) taped soundtracks, and *HyperCard* stacks. —F.D.

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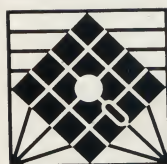
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## Multimedia Sandbox

each school creates the center from materials it scavenges, each center is different.

You can make your school's first publishing center a school-wide process. Other teachers can donate old equipment which they are not using. The principal can help you find a wheeled cart which was tucked away and forgotten. Students can take home notes ("published" on the computer) inviting their parents to contribute used equipment from around the home. (Many homes are littered with extra tape recorders, "boom boxes," keyboards, old VCRs, and TVs which parents would love to donate to their school—especially if persuaded that their donations would be used for educational purposes.)

Many teachers report that they began their multimedia publishing centers with fear and trepidation. They had barely mastered keyboarding on a Commodore 64 or Tandy 1000, and now, suddenly, they were leading a group of enthusiastic students who were talking about connecting up a computer, a video camera, a boom box, a VCR, and the classroom's record player. Initially the teachers figured they had to know in advance what to do each step of the way. But they were relieved to find out that this was not necessary—that the students were happy to pitch in and learn with them.

The best tack to use is to follow the KISS rule—"Keep It Simple to Survive!" You don't need to assemble a full-fledged multimedia center at the beginning. Instead, start by focusing on one or two media and add others gradually as they seem necessary or important. For example, maybe you want to start your young authors with a simple audio project. You and your class can set up a "recording studio" with an old tape recorder or a boom box that a student brings in. Have students read their stories and poems into the recorder's built-in microphone and, voilà, you have "Literature on the Air," a weekly radio program in which budding young authors do readings from works in progress.

Or you can try a simple movie. First, track down your school's video camera. Have your class figure out how the camera works. Put in a blank videotape and let the students create a simple skit on "Fractions in Everyday Life" or

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Next month, we'll take a closer look at the hardware and software used, the connections made, and the approaches taken in establishing a successful multimedia classroom. ■

**Fred D' Ignazio** is President of *Multimedia Classrooms, Inc.* (1302 Beech St., East Lansing, MI 48823; (517) 337-1549). He conducts teacher workshops all over the U.S. and Canada, and is a national leader in the areas of multimedia, merging technologies, and cooperative learning.

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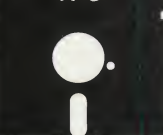
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young students. The very nature of computers requires a very specialized vocabulary. It is difficult to define these words without using other computer-related terms. To use *My Computer Picture Dictionary*, students need a prior understanding of computers and developed reading skills.

While the pictures add to some definitions such as understanding the size and detail of a chip (pg. 10), in other cases they do little to further the meaning such as a photograph of a printer (pg. 25). In many cases there are no pictures, or sketches are used instead of photographs.

*My Computer Picture Dictionary* could be used by students who have some prior knowledge of computers, but I would not recommend it for beginners or very young students. In building a library of computer materials, this is not the first book I'd purchase. However, if students were already using several sources, this book could provide a current list of computer-related terms.

### COMPUTERS ARE FUN

by Jean Rice and Sandy O'Connor; illustrated by Judy Haeny and Marien Haley  
62 pages, \$3.95

### TEACHER'S GUIDE AND ACTIVITY BOOK TO ACCOMPANY COMPUTERS ARE FUN

by Jean Rice and Sandy O'Connor; illustrated by Judy Haeny and Marien Haley  
92 pages, \$12.00

Both published by T.S. Denison & Co., Inc., Minneapolis, 1981

Reviewed by Kathy Reed

This 62-page book, written for primary grades, is a delightful addition to the growing library of computer materials.

The primary grades have suffered from a lack of up-to-date, accurate, easy to understand material. *Computers are Fun* helps fill this gap. It includes chapters on how computers help us, the history of calculating devices, computer parts, microcomputers, flowcharts, and what a program is.

My students enjoyed the text when it was read aloud; however, they did not care for the dialogue style when reading it themselves. This book is probably best used by reading a few pages at a time aloud to students and then discussing the material and doing the suggested activities from the *Teacher's Guide*, although some second graders and many third graders can read the text independently.

*Computers Are Fun* would be an excellent addition to school libraries, although the book could be improved by using more photographs, rather than drawings.

The most impressive part of *Computers Are Fun* is the *Teacher's Guide and Activity Book to Accompany Com-*

*puters are Fun*, designed to be used directly with the student text.

This guide provides a suggested course outline for grades K-3. It provides page by page teaching suggestions, chapter objectives, vocabulary words and teaching masters to accompany the text. There is an "evaluation" crossword puzzle for each chapter, as well as an evaluation quiz for the book.

Finally, the authors, Jean Rice and Sandy O'Connor, have provided a list of resources which include films and other multi-media materials, a bibliography (complete with suggested grade levels) and a glossary.

The guide is outstanding and combined with the student text is an excellent resource for primary teachers who plan to teach about computers. Both of these books are a "must" for the primary classroom!

### KATIE AND THE COMPUTER

by Fred D'Ignazio

Illustrated by Stan Gilliam

New York, Creative Computing, 1979, \$6.95

### THE CREATIVE KID'S GUIDE TO HOME COMPUTERS

By Fred D'Ignazio

New York, Doubleday & Co., 1981, \$9.95

Reviewed by Louisa Horvath

[Editor's note: Louisa J. Horvath is the children's librarian at Canal Fulton Public Library, Canal Fulton, OH 44614, as well as a computer hobbyist and writer.]

Fred D'Ignazio is in the forefront of an important and growing movement among computer professionals to inform young people about the wonderful world of computers. As a masterful communicator, D'Ignazio utilizes fantasy as well as "Super games and projects" to tantalize youngsters with the "bits and bytes" of contemporary computers.

The fantasy technique is employed in *Katie and the Computer*. In this story a young girl falls into her father's computer, where she explores the various parts and functions. Here she meets the Colonel or operating system of the computer, the flower painters who create colors for the screen and the table handler who sorts and classifies myriads of information. As in most fantasy, the blackguard (the villainous bug) is struck down, in this case by the Colonel's sword.

D'Ignazio tells of his use of *Katie and the Computer* in teaching children aged 3-11 in the September 1980 issue of *Creative Computing*. For youngsters under six, D'Ignazio dramatizes the story and discusses why Katie's world was not "real." He also reads the book to second and third graders and discusses with them some basic facts about computers. To the oldest group, age nine and above, D'Ignazio again reads *Katie*, which he uses as a catalyst for discussions on computers, adventure games and robots.

*Katie* is more successful as imaginative fantasy than as factual text. The story approach just does not work

well in conveying information to young children. Good picture books, particularly for preschoolers, do not inform; they tell a story.

(For those who wish only facts, *What Is a Computer?* by Marion Ball (New York, Houghton Mifflin, Co., 1972) is a better choice than *Katie*. Ms. Ball's book is concise, readable and correct.) The illustrations in both books are colorful and appropriate.

In *The Creative Kid's Guide to Home Computers*, D'Ignazio suggests projects for young people. "This book is not a cookbook; it is an idea book," the author says.

D'Ignazio pushes youngsters to write their own computer programs. He includes a sample listing of a game program entitled "Trapped" and strongly suggests that writing game programs is an easy way of learning how to create software.

Youngsters who take chess and *Dungeons and Dragons* seriously will see that they must regard computers in the same manner. When pitted against *Chess 4.7*, an advanced chess program, David Levy, an international chess grand-master, said of his electronic opponent, "Personally I think I will destroy it." However, Levy was glad to escape with a victory and now predicts that within five years he will be beaten by a computer.

Robots, those things of science fiction fantasy, are also a part of the world of today's young people.

D'Ignazio interviewed three teenage inventors, describing in detail what their robots can do.

Computer poetry, music, graphics, computers programmed to help catch criminals—the list of uses for computers is endless. D'Ignazio leaves no capability of computers undiscussed. Of special interest is the wide variety of ways computers can help the handicapped, a feature of the mighty micro that is not discussed enough.

Helpful appendices climax the specialness of this book. Listings of home computer books, magazines and places to write will help answer young people's questions and can help librarians answer queries from young computer hobbyists. A useful checklist, "Before You Buy a Computer," will help students and school librarians. Beginners will benefit by his glossary of computer terms.

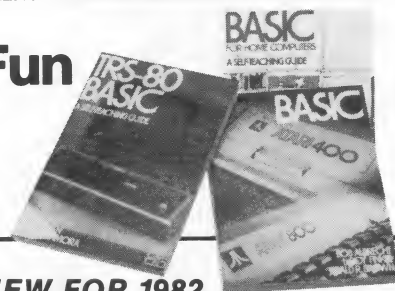
D'Ignazio is preparing youngsters for a place in the world of computers. *Katie and the Computer* is imaginative fantasy; *The Creative Kid's Guide to Home Computers* lists "Super games and projects" for the young hobbyist.

D'Ignazio is unique, special, talented and well versed in the workings of computers. He dares to experiment and go beyond simple texts. In doing so, he is one of the most promising authors writing on computers for young people today.

END ■



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# MULTIMEDIA DETECTIVES

BY FRED D'IGNASIO

**F**ourth- and fifth-grade students and teachers at Murphy Elementary in Haslett, Mich., are not in the classroom today. They are tiptoeing around in rubber boots in a bog near the school. Their aim: to investigate the fragile wetlands that abound in Meridian Township but that are *increasingly at risk* because of the rapid commercial development in their area.

The students are laden with notebooks, pens, pencils, a tape recorder, video recorder, and pocket camera. They are "multimedia detectives," part of an ongoing program in Okemos, Haslett, and East Lansing schools.

The program, now almost two years old, enables teachers in the three school districts to explore ways in which multimedia and telecommunications technology can help their students learn how to engage in publishing.

For the last two years I've been working on the Multimedia Detectives project as a consultant, author, and instructor on behalf of my company, Multi-Media Classrooms Inc. Among our project's many program sponsors is the Michigan Information Technology Network (MITN), and

we use its computer server to maintain our own Web page at <http://www.mitn.msu.edu/mmd/mmd.htm>.

The teachers in our project and their fourth- and fifth-grade "detectives" plan to develop the home page into an online multimedia gallery featuring students' science research on local wetlands in Meridian Township. Teachers also would like their students' Web pages to feature links to wetlands resources pulled from remote libraries, laboratories, and other research locations around the globe.

To help the students become more competent as Web explorers, we use two-way cable TV as a control and viewing mechanism. The cable connection was supplied by TCI Cable of Michigan. TCI has set up two-way links in elementary school classrooms in each of the three participating school districts, and a fourth two-way link has been set up in Multi-Media Classrooms' interactive TV studio in Okemos.

**Michigan elementary school kids learn research and publishing skills through the magic of the Net.**

TCI Cable and Michigan State University have installed a high-speed ChannelWorks cable modem at the Multi-Media Classrooms site. The modem, made by Digital Equipment Corp., is the size of a small VCR. The ChannelWorks box is attached to an IBM PC via an internal LANtastic Ethernet card and a standard Ethernet cable. A second connection on the back of the box is attached to normal coaxial cable just like

*As part of the Multimedia Detectives project, Michigan fourth and fifth graders explored a local bog to gather research for their Web page about wetlands.*



Jeffrey Omura and Marisa Novella with their teacher, Cindy Laskas, explore a fragile ecosystem (bottom). Jessica Maynard and Jeffrey Omura take careful notes (right).



the kind on the back of a TV or VCR.

Thanks to an online gateway provided by MSU, our project's PC is now on a high-speed network that allows us to send and receive data over the Internet. The most remarkable benefit of this setup is speed. We can transmit and receive data at the full Ethernet speed of 10 Mbps—1,000 times the speed of a normal dial-up phone line. The high-speed link makes it possible for our fourth- and fifth-grade detectives to be full-fledged multimedia Web researchers using a Web browser.

How are students able to see the Web screens on the computer? After all, the ChannelWorks box and its PC are tucked away in a back room at Multi-Media Classrooms, far away from the students' schools.

The key is cable TV. Students are able to see the Web research pages on their classroom TVs. This is accomplished via the two-way cable linkup that beams the Web screens appearing on the computer at Multi-Media Classrooms simultaneously into the classrooms in the three districts. The computer is able to "publish" these screens over television using a MediaLogic box that translates the computer's RGB video to normal TV



(NTSC) video, which is then broadcast over the cable line.

The students may be able to see the Web pages on their classroom TV, but how are they able to control the remote computer located in the Multi-Media Classrooms studio?

Because the cable line is two-way for audio as well as video, the students are able to guide the computer operator at Multi-Media Classrooms just by talking. Each of the two-way cable sites has a standard video camera mounted on a tripod, with a small home-video microphone leading from the camera over a 10-to-20-foot extension cord. To change the direction of exploration on the Web, students talk into their camera microphone and their voices come out loud and clear in the Multi-Media Classrooms studio.

As a powerful metaphor to help students visualize this highly abstract process, we have been using the popular *Magic Schoolbus* books written by Joanna Cole and published by Scholastic. We liken our cable/Web connection to the Magic Schoolbus, which enables a classroom full of students to explore the world of science firsthand by traveling anywhere in space and time almost instantaneously.

Our Magic Schoolbus is our PC, which has been souped up with the

addition of the high-speed ChannelWorks box and fiber-optics connection provided by MSU and TCI. The magic highway, which can take us around the globe or even into outer space is, of course, the World Wide Web.

In the *Magic Schoolbus* books, the bus is driven by the students' teacher, the zany Ms. Frizzle. In our project I get to be the "bus driver," and I drive our bus by clicking the mouse buttons on hyper-text links that whisk us around the world on the Web. And like Ms. Frizzle in the books, I take requests from the students and drive the bus to research sites to help the students find answers to their science questions.

In a way, the Magic Schoolbus is offering an affordable opportunity to explore the near future. We have heard how we will soon have video servers that will be controlled from homes and institutions on the Internet. But thanks to the Multi-Media Detectives partners, fourth and fifth graders in our three districts are already controlling a shared, low-cost video server to do collaborative, real-time research at high speed on the Internet.

In the future, multimedia will be delivered over new information appliances that combine today's computer, telephone, and TV. The way most people will access information will be via a

miniature keyboard, or "zapper." Information will be delivered via composite documents composed of text, sound, images, music, and video clips.

The Web offers a good preview of the type of "documents" with which we will interact in the future. Using Web browsers we will be able to search online libraries and access real-time information all around the globe.

How can today's students learn to be authors of these online documents and not just browsers and researchers? Students could learn HTML, but there are few simple guides available to the average student or teacher.

Students in our Multimedia Detectives project are learning to author multimedia documents using inexpensive authoring programs now widely available for classroom use.

The programs include Apple's Scrapbook, Roger Wagner Publishing Inc.'s Hyper Studio, Pierian Spring Software's Digital Chisel, Digital Workshop's Illuminatus, and Davidson's Multimedia Workshop.

All of these authoring programs let students practice authoring skills they

## We are instilling in our students an appreciation of the art and technology of network communications.

will need to create complex multimedia documents on the Web. At a minimum, the programs include a word processor, paint program, sound editor, method for importing, buttons that control other multimedia devices including audio CDs and laserdiscs, and hyperlink buttons.

Students can create rough drafts of their online reports, essays, and interactive databases in any of the authoring programs. The tools give them experience integrating many different multimedia data types into a single coherent document.

Students also learn how to compose hypermedia documents that contain

references to remote documents and media elements that can be retrieved in real time by a simple point-and-click.

The students transfer the documents to floppy diskettes, which are turned over to the Web experts at MITN. The MITN programmers translate the students' documents into HTML documents and place them on the Web server, where they can then be accessed globally by any person with a browser.

In the near future, we plan to teach students how to convert their own documents into files ready for immediate Internet publishing.

By giving students early experience in authoring and publishing multimedia documents on the Web, we are instilling in them an appreciation of the art and technology of network communication and preparing them for the future. ■

*Fred D'Ignazio (dignazio@msen.com) is a Lansing, Mich.-based author and magazine columnist who writes about education and technology.*

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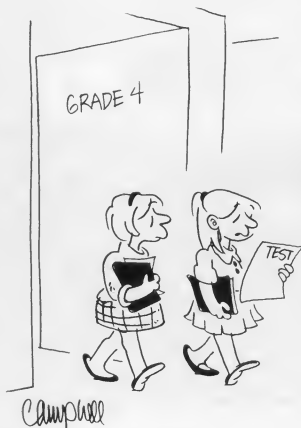
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sues are addressed. Many of the current uses of technology are add-ons to existing instructional practices, while the potential to expand the uses of technology to take the place of some of these practices is yet to be fulfilled. Preservice and inservice training programs have yet to coordinate their uses of instructional technology so that current and prospective teachers are trained to use the most advanced technological pedagogy.

Educational funding patterns need to be revised to promote rather than inhibit the development and use of technology. In addition to funding the reforms described above, the reform of funding itself must be accomplished to stimulate wider acceptance and greater use of technology by teachers and principals alike. More emphasis must be given to the development of partnerships — between teachers and parents to maximize the use of educational technology in the home, between educators and businesspeople to facilitate the acquisition of computer hardware and software at the lowest possible cost, and between schools and districts and the state department to insure broad ownership of newly developed technological programs. Educational planners must also be more sensitive to the impact of technology on other education reforms.

Technology is not the sole solution to the challenges confronting education in Utah. But without it, no other solution will be entirely successful. Technology is both a far-reaching education reform and a facilitator of other reforms. It may well be the best investment we can make to insure our future educational excellence. K



"I hate playing 20 questions with Mrs. Reed."

# Bringing the 1990s To the Classroom Of Today

*Impersonal technology can create a rich, collaborative learning environment that spreads from classroom to classroom, according to Mr. D'Ignazio.*

BY FRED D'IGNAZIO

**D**URING THE PAST three years I have conducted workshops in the use of educational media for teachers and administrators in elementary, middle, and junior high schools. I have worked with people from 50 schools in seven states and three Canadian provinces. I wanted to share my publishing experience as a children's book author, television and radio commentator, and magazine journalist and my belief that multimedia publishing will become an important part of the work environment of the classroom of the 1990s.

The workshops have confirmed my belief, while demonstrating that *impersonal* technology can create a rich, collaborative learning environment. Teachers return from workshops to their classrooms feeling that it's okay to experiment with new equipment, to make mistakes, and to learn from each other. Everyone takes responsibility for one another's training. Teachers transfer the process to the students and learn to play the role of learners as the students create innovative solutions. This inventive, collaborative approach to technology gradually transforms the school's learning culture, spreading from classroom to classroom

and eventually having an impact on the entire school.

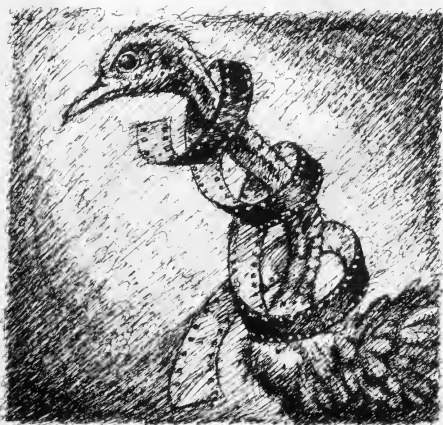
The workshops had modest beginnings. The first ones were open-ended "sandboxes" in which I encouraged teachers to make sound effects on musical keyboards, design banners and newspapers on computers, and create movies with video cameras. As I developed expertise as a trainer, the workshops became more structured, and a *multimedia publishing work station* evolved. It consisted of a cluster of equipment — including an Apple II computer, a tape recorder, a video camcorder, a videocassette recorder, and a TV monitor — that fits nicely on three small carts.

As soon as teachers arrive at a workshop, I divide them into teams and assign them to collaborate on a curricular video production. Teachers in my workshops have prepared videos on Helen Keller, zoo animals, the scientific basis for the seasons, Martin Luther King, math word problems, the electoral process, and a wide variety of other subjects. Their creativity and ingenuity are always a delight, and, by the end of a workshop, the teachers themselves are amazed at how well they have mastered the technology.

## THE KNOWLEDGE NETWORK

For the past two years, the 50 schools (including three schools from Apple Computer's prestigious Apple Classrooms of Tomorrow program) have been

FRED D'IGNAZIO is president of Multi-Media Classrooms, Inc., East Lansing, Mich. He wishes to acknowledge Craig Stirton and Anne Porter for coining the term transformational environment.



linked together in a "telepublishing network," which we call the Knowledge Network. Via modems and telephone lines, teachers and students separated by thousands of miles can link up with one another.

The electronic network, subsidized by Simon Fraser University in Vancouver, British Columbia, allows students and teachers to *publish* innovative lessons that they have created in their classrooms. Initially the publishing was limited to text only (words and numbers). However, we now send student-created video images over the network, and this fall we plan to begin sending digitized music, sound effects, and student voices to remote classrooms on the network.

Teachers and students are enthusiastic about the network and the potential audience it represents. "It's one thing to write a paper when you know the only one who's going to see it is your teacher," said one Alabama eighth-grader. "It's entirely different if you know that what you produce is going to be 'broadcast' to hundreds of teachers and students as far away as Canada. It makes you work a lot harder and look a lot sharper. It made me really want to do my best."

#### LEARNING WHAT WORKS

I began conducting workshops with the simple idea that the training would strengthen the communication skills of teachers and students. Today, the success of my program has forced me to reevaluate what is really going on. I have also had the chance to work with dozens of excellent administrators and teachers who have explained to me why my workshops have been so successful. They have identified the following as key reasons for the success of the workshops:

- *Cooperative learning.* This is per-

haps the most powerful part of the whole enterprise, and it has the greatest potential for transforming schools. Teachers in my workshops are required to work together in problem-solving groups from the moment they arrive, without the help of an expert or a manual. In addition, the collaborative process is self-nurturing and cumulative. Teams are responsible for helping each member acquire confidence and expertise in the team's specialty. Team members learn to collaborate across team boundaries to "get a product out the door" efficiently and under deadline.

Back in the classroom, teachers encourage students to collaborate in the same manner — across classrooms, across grades, and across subjects. Schools that were insulated from each other learn to collaborate on common projects, especially ones related to doing research in the community and initiating partnerships with community organizations. Once in motion, the process is self-sustaining and unending. In one school district, for example, I directly trained only 25 teachers. Two years later, I returned to the district and learned that 130 teachers now considered themselves skilled in multimedia publishing. All these additional teachers have learned on the job, without benefit of district inservice training, outside consultants, or such tangible incentives as extra pay or accreditation.

- *Pride of authorship.* All the teachers and students who learned how to do multimedia publishing were excited about being able to express their knowledge and ideas in a variety of ways. The curriculum itself was transformed, according to one fourth-grade teacher. "Video, publishing, and computer pen pals made our curriculum come alive," she said. "Students took my old lesson plans and came up with fresh approaches that made learning more fun for me, too."

- *Self-directed learning.* When I turned over responsibility for learning to the teachers in my workshops, I had unknowingly unleashed a powerful force. The teachers saw how much they could learn by working together and by relying on their own common sense and ingenuity. They took the same process back to their classrooms, with extraordinary results. Students accepted much of the responsibility for daily lessons. As "producers" of learning, they also took responsibility for managing all the equipment in the classroom, including sched-

uling, security, planning, and sharing with other classes in the school. The students, in effect, had "automated" classroom management. And they had no problem coming up with clever ways to integrate the equipment into daily lessons in math, social studies, language arts, and other subjects.

- *Scavenging for multimedia.* High technology can be great, but only if you have access to it. To insure easy access by all school districts, rich and poor, I created the idea of "Scavenged Multimedia Work Stations." Most schools now have a desktop computer, a tape recorder, a videocassette recorder, and a television set. Many are purchasing a school camcorder to be shared around the building. The trick is to combine all these things into a multimedia "publishing center." When teachers attend my workshop, they haul in their dusty tape recorders, Califone record players, and other equipment pulled together from around the school. Creating the center becomes a shared, collaborative experience that encourages schoolwide pride and participation. It also taps teachers' marvelous ability to improvise — a basic survival skill for most teachers.

The multimedia centers enable students to create classroom presentations in wholly new ways — video term papers and book reports, radio documentaries in science, electronic slide shows, animations of math word problems, publications, banners, ads, and so on. Students dramatically increase their productivity and get the most out of the equipment they already have. The typical center gets pushed around the school, so that all students can have access to it. Equity, access, innovation, and excellence are all outcomes of the process.

#### LET'S FIGURE IT OUT TOGETHER

The subtitle for my workshops might be: "Gee, I don't know. Let's figure it out together." That is what I say to teachers whenever they come to me with a question. It also seems to be at the heart of the process that gets carried back to the schools. An atmosphere of innovation and increased productivity influences the way subjects are taught. Students adopt the workshop motto, "Demo or Die!," which expresses well their desire to come up with new ways to show what they know — to their teachers, to their classmates, and to other students on the Knowledge Network. ☐

## Teaching, Learning, and the Transformation of Knowledge

By Fred D'Ignazio

**Schools need to change dramatically over the next few years—but not by merely buying new computers and building expensive new classrooms.**

Real, permanent, *necessary* change must come from within. Internal, structural changes must include: How teachers teach; how students learn; how classrooms are managed; how knowledge is structured; and new ways for teachers and students to *construct* knowledge every day on an accelerated, intense, quick-and-dirty level. Some core instructional methods for achieving the above goals are:

- Dramatic restructuring of curricular knowledge through the transformation of curriculum from linear text delivered by third-parties to interactive multimedia constructed “just-in-time” by student and teacher explorers in the classroom.
- Collaboration. (Shared minds to solve the hyper-complex problems of the 21st Century.)
- Pride of authorship. (Learning through authoring.)
- Constructionism. (Learning by assembling meaning from pieces of reality—multimedia data types—that are all around us.)
- Disappearance of old teacher and student roles.
- New roles for the teacher: Classroom manager, author, explorer, enthusiastic learner, electronic curriculum designer, ad hoc explorer-team member, guide, scout, motivator, coach, “go-for,” and inspiration.
- New roles for the student: Co-teacher, co-manager, technology consultant, technol-

ogy troubleshooter, multimedia plumber, investigator, researcher, explorer, author, publisher, presenter, electronic curriculum developer, peer coach, nurturer, trainer.

- The classroom can no longer be a controlled, risk-free, information-sparse environment. Instead, it must be an “Outward Bound” wilderness environment that allies teachers and students in collaborative teams who tackle their assignments knowing that time and resources are scarce and inadequate; that information is constantly flooding in, changing, and difficult to interpret; and that maximum quality and productivity can be accomplished only if all persons collaborate and focus on team process as the number #1 outcome.
- The classroom and the school must become an *innovation and transformation engine*: An environment for constructing knowledge locally (real-world investigation) and globally (through electronic-highway information) and by inspiring its participants to constantly learn, train, and grow through the constant editing, organizing, and sharing of knowledge across the classroom, around the school, and with parents and the local community through online, just-in-time training, research and publishing activities, experiments, demonstrations, challenges, and reports.

None of these ideas is far-out, fluff, or an expensive luxury. All elements are essentials to survive and be successful in the “Lean and Mean” 90s. We must be equipped to cope with rampant, radical growth and change in

technologies; harsh, global competition; large-scale socioeconomic changes in our country; surprising shifts in popular culture; multi-culturalism and neo-tribalism; and job layoffs, job insecurity, and overnight job changes.

Our goal as teachers should be to spawn excellence in the classroom—not as an occasional surprise but as a daily, group goal for ourselves and for every student in the room. Sustained group and individual excellence stems out of the philosophy of *teacher explorers*.

### Teacher Explorers

In a teacher explorer classroom, adults and young people share a *joint* responsibility to:

- Self-manage the classroom and make it run smoothly, humanely, harmoniously, and at maximum performance.
- Explore, learn, investigate, research, experiment, edit, think, speak, listen, converse, debate, read, and write.
- Teach, nurture, coach, share what they know.
- Concentrate on human-centered growth, innovation, and transformation as the most important classroom goal.

Most of what is learned is constructed by the teacher explorers themselves out of local (real-world, school, community) and global (electronic, multimedia) research and investigation and connected to the original curriculum in terms of desired outcomes and curriculum goals.

Young people in this setting become *con-*

tent specialists and technology consultants. Adults in this setting become *process specialists* whose primary goal is to inspire the best group and individual process in the classroom; and *resource managers* whose job is to scavenge the resources needed “just-in-time” for excited groups of students working collaboratively as *knowledge construction crews*.

Young people investigate materials and share new knowledge as they uncover it using a wide array of multimedia research and publishing tools. Young people work as technology *SWAT teams* (Student Work Accelerated through Technology teams) to set up technology equipment, operate it during class hours, troubleshoot it, guarantee its safety and security, train adults, and design electronic curriculum materials for classroom use.

Teacher Explorer *assessment* can be symmetrical and mutual (teacher-student) and can be conducted using new multimedia tools to measure the entire group (adult-young people’s) success in collaboratively promoting maximum learning, growth, and productivity for all persons in the *community*. The object of the tools is to measure group and individual performance, not just mere knowledge. The tools evaluate the quality of performance reflected in a summation of an adult or young person’s work over a given period (nine weeks, semester, year, etc.). The work is collected in the form of a Teacher Explorer Portfolio. Both for young people and adults, such a portfolio might include examples of individual and group:

- Writing (paper/disk), measuring written-communication skills.
- Visuals, graphics, diagrams, photos (paper/tape/disk), measuring image-communication skills.
- Digital audio (tape/disk), measuring musico-linguistic communication skills.
- Videos (tape/disk) measuring whole-person performance.
- Multimedia databases (disk/paper), measuring teaching/content linkages, connections, analysis, points of view.
- Multimedia simulators (disk/tape), measuring teaching/ content/process mastery.
- Experimental prototypes (disk/tape/real-materials), measuring design/engineering/ construction skills.

The chief goal of all products is to measure *classroom process*. The products are a *multi-media mirror* of the process of learning, teaching, and personal transformation that occurs in the classroom on a regular basis.

Some of the products can also be regarded as classroom-constructed *interactive teaching materials* that motivate, inspire, and inform young people and adults and enable them to “transition” today’s classroom into a *community information, teaching, training, and transformation center of tomorrow*.

The acid test for all classroom materials will be to invite members of the local community—primarily parents, local business people, and representatives from local government—into the classroom for student-led training. The classroom teacher’s and students’ overall grade depends on the effectiveness of (1) the training experience, (2) the training teams, and (3) the training materials devised by the classroom’s teacher-explorers (teacher and students working together).

### Expert in a Box

New ideas can best be transferred into a school if they are combined into an “integrated solution”—a system that includes hardware, software, training, motivation, and reference materials *all in one package*.

We must use the most promising interactive training / transformation system to deliver this solution (e.g., DVI and QuickTime *instant digital video*). Some instant digital video modules need to be developed up front, but the bulk of the modules can be developed by cadres of teachers and students using their classroom multimedia station or more expensive “souped-up” multimedia-publishing tools in the library media center/ TEC center.

The idea of the digital-video “expert in a box” or “trainer in a box” is not far out; rather it is a necessity in the downsizing, budget-conscious, personnel-scarce yet technology-saturated schools of the nineties. It is also the latest way of packaging “the author’s voice” in the most interactive, humanlike, and lifelike medium available.

All of the classroom training modules will be seminars that appear in the format of a multimedia database. Teacher explorer stations can be complete hardware/software/ training/transformation *kiosks* integrated into one platform, so the stations come fully loaded with the initial databases on board. Later, as student-teacher cadres create new databases and enrich older databases, they can transfer these databases onto CD-ROM discs. (It is possible to get the CD-ROMs mastered

cheaply since classrooms will not need them in quantity.)


This new restructured classroom of the future can be built with simple, relatively inexpensive building blocks:

1. *Just-in-Time Trainer* Digital Video Interactive Modules to inspire, inform, train.

2. *Teacher Explorer Kiosk*: A teacher/student workstation, presentation station, bulletin board, one-computer-classroom research & publishing station that comes equipped with a video camera, computer, music/sound card, modem, network card, Quicktime or DVI, printer, CD-ROM drive, and active-matrix LCD panel.

3. *Teacher Explorer Center*: A multimedia learning lab/library of the future that regions and states can set up as a launch pad for cadres of “train the trainers” evangelists to go out and spark school districts and educators in their regions. As the next step, school districts can be encouraged to set up their own TEC library/labs in their buildings to inspire and train school teachers and staff. School buildings can be encouraged to set up a TEC center as a library of the future (that functions alongside and interacts intensively with the current print-centered library). The library media specialist can offer the TEC-wing of the library “after hours” as a staff development classroom, curriculum-development center for teachers, as an electronic-publishing center for students, and as a community training center for local businesses.

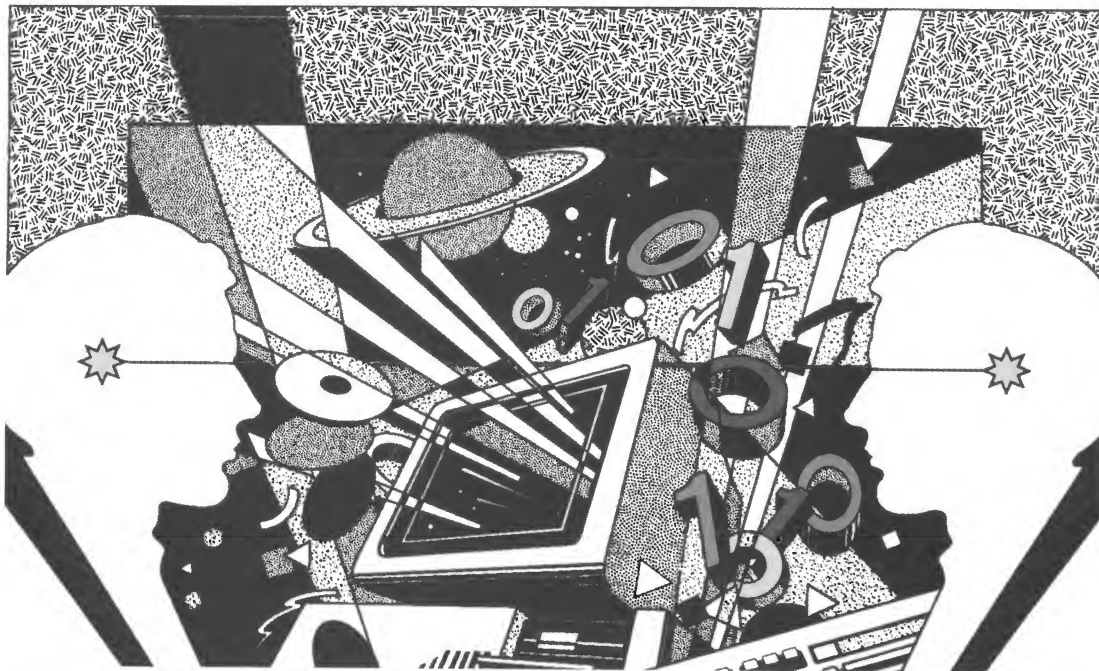
4. An *organizational-change training plan* that arms “train the trainer” cadres with their own portable Teacher Explorer Station in a briefcase or on wheels that functions as a mobile “starter kit” of tools and templates that teach how to set up a TE station, how to set up a bare-bones TEC Center, and provides a initial set of “Expert in a Box” modules that act to inspire, motivate, and train teachers in the larger philosophical ideas that underlie the process of teaching, learning, and transformation of knowledge.

Student consultants and evangelists can push the portable kit around the school building. Teacher evangelists can carry the kit to other school buildings and take the transformation process “on the road” to reach the widest group of people and spark discussion. The teacher and her cart act as a “welcome wagon” to invite additional teachers and students to participate in this thrilling new process. 

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[Fred D'Ignazio, 4121 Okemos Rd., Ste. 24, Okemos, MI 48864.]

# Distance Is a State of Mind: Virtual Reality on a Shoestring




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**Virtual space does not have to be a complex multimedia experience. Instead, it can be created simply, just by linking up two persons' voices.**

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When we talk with someone we care about on the telephone we quickly enter a virtual space of intimacy created from the familiar sound of the person's voice, their instant response to our voice, and the power of our imagination. Our imagination is so powerful that it can weave an imagined real-world "meeting" from the slender thread of two human voices. We may be having our phone conversation in the kitchen looking out a window at a playset in the backyard, but we no longer see the backyard. Our mind's eye takes over and we see a constructed image of the person we are talking to, and we see the events, stories, and people who appear like actors on a stage as they are introduced in our conversation. What we are constructing is a virtual play, a radio drama of the 1930s and 1940s, purely from the sounds coming out the ear piece of a small nondescript slab of plastic.

The telephone is popular because it is so easy to enter this virtual space. We can substitute the "shadow" senses of our imagination for our real-world eyes, ears, bodies, etc. during the course of a conversation. During a good conversation, physical distance between you and your friend, your parent, or your child disappears and becomes merely a state of mind. Conversely, if the conversation

turns sour, then the physical distance between the two of you may seem trivial compared to the emotional distance that now separates you.

Telephone conversations help us think about how we might create virtual space, virtual meetings, and virtual conversations on a shoestring in a classroom:

1. Virtual space does not have to be a complex multimedia experience. Instead, it can be created simply, just by linking up two persons' voices.
2. In virtual space emotional (or imagination-centered) distance becomes more important than real geographical distance. The illusion of closeness and intimacy with another person can be intellectual, emotional, and even sexual.
3. In virtual space one's normal sense organs (including eyes, ears, sense of taste, smell, touch, etc.) temporarily become disabled if they are not needed to participate in the virtual experience. This disabling of the external senses is done deliberately by the mind to remove distractions so the mind can focus on believing in the intimacy and reality of the virtual experience.
4. At the same time that the external senses are disabled,

internal “conceptual” senses spring to life. In a phone conversation, for example, we may not be able to see the other person, but we substitute a remembered or invented image in front of our mind’s eye while we are talking with that person. Similarly, if the person talks about an experience involving the senses, we participate vicariously by imagining how a meal tasted, how it felt to climb a steep hill, suffer a headache, or smell the fragrance of a flower. In a good conversation over a telephone, these vicarious experiences can be so powerful that they may be remembered afterwards almost as vividly as if we had lived them ourselves!

5. The experience of virtual intimacy (or tele-intimacy) is experienced by almost everyone who uses a telephone. This indicates that all humans are born with an imagination and (imagination-based) shadow senses to construct a virtual experience out of extremely limited sensory cues.

### **Snail Mail, Distance, and Simultaneity**

The lowly telephone demonstrates that virtual space and virtual intimacy between two human beings can be created simply and inexpensively. Are there other low-cost forms of telecommunications that also create virtual space for people?

Let’s take the case of S-mail (“snail mail”—regular paper mail). S-mail does not use one of our original, non symbolic “power senses” such as sight, sound, smell, and touch. It is primarily conducted in secondary level symbols— or words—in which humans embed meaning. Unlike the primary senses that sense reality directly (for example, the heat of a fire, the impact of a hammer on our thumb, the distressing odor of decaying garbage, the horrific sounds and sight of a saber-toothed tiger!), words must first be decoded in order to have meaning.

On the other hand, once we learn to read fluently then the words tend to “morph” almost instantly into the sights, sounds, and events that they describe. And powerful words can map themselves into vivid real-world experiences through the mental alchemy of our imagination.

### **Which Came First—Virtual Meetings or Words?**

In all the eons of our biological past, we communicated face to face—or not at all. That is, we had to simultaneously be in the same place at exactly the same time or communication could not take place. In our recent past, when written symbols and language were invented we were able to break the lock of simultaneity upon human

communications. People separated by gulfs of distance and time could communicate with each other and share intimate experiences, ideas, and emotions.

Letter writing, even with a quill pen or papyrus, has always been a virtual act. In the act of correspondence, two people enter an imagined virtual space—a room all their own. In this room they have a conversation. With primitive technology it took many months or years for this conversation to unfold. But if the conversation were authentic and meaningful to the participants then the gaps in time didn’t matter. The other person could be called up through the correspondent’s imagination at will. Every time they read the letter the other person would return to the room. Their image would become clear in the mind’s eye. Their voice would come alive in the mind’s ear. A strong physical sense of closeness—the other person’s presence—would be the reward for using the imagination to reconstruct the virtual room.

### **Am I Here With You Now?**

What I’ve just described above is the same imagination illusion that your mind conjures up when you are reading this article. As you read these words where are you? Right this instant! You may be on a plane, in a boat, lying in bed, or on the john, but that’s only physical reality. And physical reality recedes when your shadow senses go to work and reconstruct a new meeting place inside your mind. What kind of virtual room have you built? What kind of voice do I have when you read these words? Do you imagine what I sound like or look like, or am I disembodied, tumbling in a formless free fall?

In fact, I’m on an airplane, a Beechcraft 1900C (the world’s tiniest commercial passenger plane), flying over a farmer’s field in South Central Illinois, on my way to Quincy, Illinois, on the banks of the mighty Mississippi. I’m wearing my blue shirt with my red Koala tie, and I’m a little punchy after the mad dash I made to the Detroit Airport from my hometown in Lansing, Michigan.

Did you guess it right? Do you care? Does it matter what I look like?

Of course not. What really matters is that when you read my words (perhaps months after I typed them into my little notebook computer on the tiny plane) you feel like we are having a conversation, and we are “someplace” together, talking personally, one on one, about things that matter.

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**Letter writing, even with a quill pen or papyrus, has always been a virtual act. In the act of correspondence two people enter an imagined virtual space—a room all their own.**

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**What makes an experience "virtual" arises out of our most important "cyber-organ" of all: our imagination.**

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### **From S-Mail to E-Mail**

Next let's return to the present and think about what is already possible. You can now write to me on the Internet (I'm dignazio@msen.com), and we can begin a real correspondence, not just an imagined one created when you read the words on this page (or screen).

E-mail is actually a pretty powerful generator of virtual reality. All that counts is that both parties write back within a certain time period—say one or two days. If this is done regularly, pretty soon the illusion builds up that you are in a room having a conversation. This illusion is handled with printed text on a printed (or electronic) page and is more like letter writing than carrying on a phone conversation. But it is even more virtual than a phone conversation because the two parties seem to be in the same virtual room no matter where they are in space or time. The "appointment" the two make with each other is not based on a place or hour. The only requirement is a regular conversational "return" (figuratively batting the tennis ball back to the other side of the net) to keep the conversation active and the illusion of a virtual meeting intact.

### **From E-Mail to I-Mail**

Now imagine that with the emergence of the information highway, magazine articles like this one become Instant, real-time, and Interactive (hence the term "I-Mail"). Imagine that the moment I write these words—"From E-Mail to I-Mail"—you see them appearing on your computer screen, no matter where I am and no matter where you are. Imagine too that with I-Mail you have the opportunity to read a paragraph or two of my article and then instantly respond—even while I am still up here flying in my little plane over the Mississippi!

I had an experience similar to "I-Mail" yesterday when I appeared in a telepanel with fellow multimedia gurus mediated by an editor from Scholastic, Inc. on America Online. The moderator and the panelists entered "Scholastic Hall" together, said hello, and immediately began talking about the future of multimedia in education. We watched each other type answers to the moderator's questions, and I became more and more "wired" because I truly felt as if I were in the same room with all these people, and in front of a large audience. My heart was beating quickly, I was short of breath, just like before a real speech or panel. And my mouth grew so dry that I downed two soda pops and a bottle of fruit juice in the first ten minutes of the panel.

### **Welcome to Virtual Reality, Fred!**

The cyber-room we entered—purely through text, —seemed very real. What made it also virtual (plastic, fantastic, elastic) was that while I was sitting with my fellow panelists at the table responding politely and taking turns, I was also able to clone myself from my panelist body (persona). I was soon running around the room, crawling under the table, passing notes, throwing spitballs, and whispering in the ears of almost everyone in the room—my panelists, the moderator, even the audience.

I was able to do this through simple "command-I" keystrokes which sent "instant" private messages to anyone who was in Scholastic Hall. As soon as I realized I could do this I started up windows for everyone in the hall and kept them active around the main window of our panel's conversation. The panel window now became "foreground" mode and a new "background" mode (the instant messages) was born. I was simultaneously able to participate in conversations in both modes, and I had a ball! Even while I was making dignified statements about the future of multimedia in the foreground mode I was slipping around in the background mode with gossipy little comments, puns, jokes, and prankish remarks. It felt as if I was in a new kind of room—a hive or honeycomb—with several compartments, each with an ongoing conversation, and I could flit like a bumblebee (Fred the Bumblebee) taking part in all the conversations at once. (For an extreme extrovert like me, it was a moment of pure joy!)

### **VR on a Shoestring**

This column has been a rambling exploration into various "low-tech" and "low-cost" forms of virtual reality, including the telephone, normal mail, E-mail, and a new kind of emerging instant, interactive mail which is now taking shape in online conversations, forums, and chat sessions.

The lesson here (if there is a lesson) is that VR, or virtual reality, is not just the stuff of power gloves, VR helmets with stereoscopic 3-D goggles, and multimedia computers. What makes an experience "virtual" arises out of our most important "cyber-organ" of all: our imagination. If a medium puts us in touch with another human being in a meaningful situation, our imagination seems to kick in automatically and persuasively so that even simple printed or spoken words can act as catapults that launch us into a virtual world. ■

*[Fred D'Ignazio, Multimedia Classrooms, Inc.,  
4121 Okemos Rd., Ste. 24, Okemos, MI 48864;  
dignazio@msen.com.]*



# The One-Minute Guru

HELPING TEACHERS WITH MULTIMEDIA AND TELECOMMUNICATIONS

When a paradigm shifts, everyone goes back to zero. Those with the edge using the old paradigm have no advantage once the new one is established.—*Joel Barker*

In the workplace of the future, the guru will be replaced by a webwork of “one-minute gurus,” all of whom share responsibility for the group’s success or failure.—*Fred D’Ignazio*

## The One-Minute Guru (OMG): An Explanation

1. An OMG is a “just-in-time” expert who shows up when you need one.
2. Because of their incredibly tight schedules, teachers must become OMGs.
3. In an OMG classroom, the teacher discards the guru role and replaces it with a webwork of OMGs made up of teachers, students, and outside helpers such as parents and content experts.

The OMG course described in this article incorporates all three explanations of OMGs.

I am working with Mary Anne Havriluk and the Florida Remote Learning Service (FRLS, a division of the Florida Department of Education) to create a new kind of distance learning course—the OMG course, which is offered for credit through the University of Central Florida in Orlando. More than 2,000 teachers have already signed up for the course, and others are signing up every day.

Six hours of video programming for the course have been produced by Jane Matheny of Infinite Communications. All curriculum materials and administration matters are being handled by Dr. Donna Baumbach of UCF. The initial hour of the course was first broadcast by satellite on January 18, 1995. The course will conclude with a live teleconference broadcast in late April 1995.

One of the course’s unique features is the OMG Gopher. The Gopher contains a live, up-to-the-second “snapshot” of the complete course manual, which is available over FIRN, the Florida Information Resources Network. As we develop new course material, we add it to the OMG Gopher.

The best part of the course is its human “gopher,” known to thousands of Florida schoolteachers as “GO4BILL,” his online address on our online Gopher-server. Gopher Bill (Bill Jordan, a veteran of

many years in the classroom) is the human side of the course. He is a witty, warm, caring individual who is the first person teachers meet when they log onto the statewide computer network for the first time. Bill moderates our course Gopher and shares tips, recipes, and simple how-to advice with one and all.

## The OMG Course—What’s the Difference?

In the OMG course, we construct “virtual” classrooms that anticipate real-world classrooms in schools of the future. The six hours of satellite video and the OMG Gopher ground teachers in a rich body of ideas, metaphors, tools, lesson plans, and activities. These materials are merely a launching pad or springboard to spark teachers and students to create most of the crucial course content on their own—in their own classrooms and schools and online over the FIRN network.

The bottom line for a teacher’s success in the OMG course is represented by two “P” words: Partnering and Publishing. If teachers and their students are successful with these two strategies, they will have created a very successful course, and they can take responsibility—and the credit—for its success.

## Partnering

The OMG philosophy advocates a technology strategy that is very different from strategies followed in most schools today. The basic message in the OMG philosophy is that gurus are quickly losing their usefulness. One or two technology gurus in a district or building are not enough—especially if lots of teachers are interested in doing lots of innovative new things with technology. Instead, the only way to keep up with technology is to cultivate a webwork of OMGs—drawn from students, co-workers, parents, and other content experts in the community. The key to success is to partner. And a teacher’s primary partners are his or her students.

The OMG structure also creates instant “electronic” partners for every

participant in our course: Here are some examples.

1. Yours truly, OMG Fred D'Ignazio, appears as a warm and friendly coach, cheerleader, and partner via the six televised course hours and via e-mail over FIRN. I repeatedly tell the teachers watching me on TV to "stop me!" They can then pause the VCR and can go right to the computer to send me an instant e-mail message asking me a question, sending me information, or just taking time to say hi.
2. Bill Jordan, Gopher Bill, is the course telehost, moderator, anchor, and handyman. Bill is available to every participant in the course via FIRN e-mail (as GO4BILL). He is the course's primary online instructor. He reviews all the teachers' homework, chats with participants, and steers them to all the rich resources available via the online OMG Gopher and over FIRN in general.
3. As part of their first homework assignment, course participants are asked to complete a survey on themselves and their students. They are then asked to browse through all the surveys and select a "buddy" classroom to link up with for the remainder of the course. Buddies become pen pals, collaborators on publishing projects, and members of an electronic support group to help each other survive multimedia and make it through the course.
4. As the course progresses, OMG participants are told to "reach out" and link up electronically with local and global partners over the Internet and FIRN, which instantly links teachers to a world filled with helpful people who will take the time to enrich their students' learning and guide them as they take their first steps into an online, real-time curriculum.

### Publishing

The OMG course offers three publishing components: recipe publishing, portfolio publishing, and thematic publishing. All three forms require course participants to partner with someone.

**Recipe Publishing.** The learning web (partnering) strategy of the OMG course is

embodied in the quickstart recipes written by OMG students. During the course, teachers and students gradually move up through five levels of publishing. As they construct their publishing centers from available equipment and supplies, students write recipes that describe how the centers operate.

Students document the five publishing levels with recipes. Recipes are short, clear lists of steps that enable another learner to master one of the components of a publishing station. The recipes are rigorously tested and reviewed by student "test pilots," by the teacher, and by students' parents. Recipes are collected and published in a classroom cookbook and are used as maps to guide the classroom through the technology "jungle."

**Portfolio Publishing.** The second publishing component is portfolio publishing specifically, a biographical "home page" to a student or teacher's portfolio. Portfolios consist of information that is motivational to students, accessible to any student, and appropriate for all students at all grade levels.

**Thematic Publishing.** After the second hour of the course, students and teachers who do their assigned homework link up with each other via FIRN. Their first task online is to become electronic pen pals and buddies. This phase gets teachers and students comfortable with sending text, pictures, and sound files back and forth over FIRN. The text can be simple student-to-student letters, teacher correspondence, and classroom profiles; the photos can be snapshots of the students and their classroom; and the sound files can be the students' voices.

After the two classrooms have begun corresponding via FIRN, teachers begin to discuss a common thematic publishing project that the two classrooms can jointly undertake. To prepare for this project, the two classrooms complete an OMG Participant Survey that is accessible on the OMG Gopher. This survey includes many questions to help teachers choose a partner who shares some of their curricular goals.

The goal of the publishing project is to create a common multimedia document (e.g., in *HyperStudio* or *Multimedia Scrapbook*) jointly authored by students in the two classrooms. Students in each classroom

contribute original reports, narratives, photos, sounds, and videos they gather from their own community or retrieve from online resources such as the FIRN Gopher, the Internet, or commercial services.

Classrooms can submit their published projects on disk to Gopher Bill, with opportunities to publish to a much wider audience via the OMG CD-ROM, FIRN's new Mosaic Service, and Mosaic servers at Florida high schools, colleges, or universities.

### A Work in Progress

The OMG telecourse is proceeding even as I write this article. Several times a day I use my laptop computer to log onto Florida's FIRN network and answer another three or four dozen letters from teachers, students, parents, and administrators who are networking with me as part of their coursework.

In future issues of *Learning and Leading With Technology*, I will keep you posted regarding the successes—and shortcomings—of the OMG course. We already know a lot of things we can improve on when we offer the course again next semester. ■

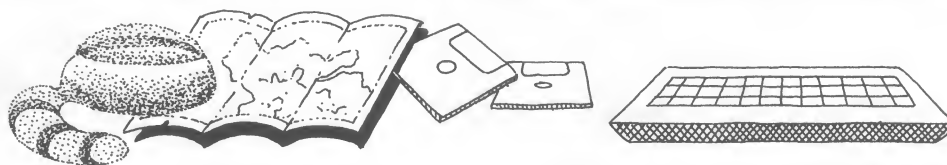
[Fred D'Ignazio, *Multimedia Classrooms, Inc.*, 4121 Okemos Road, Suite 24, Okemos, MI 48864; [dignazio@msen.com](mailto:dignazio@msen.com).]



*In the OMG course, Fred D'Ignazio is a new kind of course instructor—RAP artist, chef, street person, California surfer, and helper to thousands of Florida teachers, media specialists, and administrators.*

# Multimedia Sandbox

Edited by Fred D'Ignazio



## The Michigan Teacher Explorer Center— Experiences of Passion and Joy

by Fred D'Ignazio

*The Teacher Explorer Center is a unique restructured classroom of the future. There should be a Teacher Explorer Center in every state in the country.*

—Bob Pearlman, Technology Consultant to the American Federation of Teachers (1989-1991).

I'm the Director of the Michigan Teacher Explorer Center, located in East Lansing High School. The Teacher Explorer Center holds daily six-hour "immersion" workshops for teachers, administrators, and students from all over Michigan and around the U.S. As director of the center I have seen thousands of teachers enter the center frightened and intimidated by technology, then depart six hours later, exultant and empowered with a new vision and self-confidence about using technology in the classroom. I've seen suspicious, rowdy students take responsibility for their own learning and mold themselves into teams of explorers and authors who create amazing multimedia "essays" on critical curriculum subjects. I've seen administrators roll up their sleeves and experience team-building, peer coaching, and using technology as a tool "in the trenches," along with their teachers and students.

There are several key words that describe the kind of experience that teachers, students, and administrators have daily in the Teacher Explorer Center:

**Motivation**—Motivation is the key problem facing teachers when they try to teach today's students. Our mission in the center is to make the learning process so vital, so meaningful, so dramatic and engaging that everyone (teachers and students) is motivated at levels they never thought possible.

**Passion**—Every human being is born with a passion for learning. That passion is a fire that burns inside every learner. Our mission

in the center is to kindle (or rekindle) that passion until it burns brightly in every individual who works in our center.

**Joy**—Each of us at one time or another experiences a joy at creating something ourselves. This joy, this pride of authorship, is an outcome that we want every learner to experience in our center.

**Responsibility**—We have enormous respect for people. We expect people who come to our center to be trustworthy, smart, decent, and caring. We have created an environment in the center that turns over responsibility for learning to the learners themselves. This responsibility is invariably a burden and a blessing. It is also a device for accelerated learning.

### Our Proposal

Based on our experience in the center over the last two years, we'd like to propose that state departments of education all across the country initiate broad-based public-private partnerships and set up Teacher Explorer Centers as electronic curriculum centers, teacher-training facilities, and model classrooms of the future.

The demand for the Michigan Teacher Explorer Center has been extraordinary. During Phase One of the Teacher Explorer Center (1989-91: testing of concept; work-station prototyping; design of a model curriculum), over 2,000 teachers, students, administrators, and school board members have attended the center's six-hour workshop; an

additional 800 district teams have waited patiently on the center's waiting list for a berth in a future workshop. The center has received inquiries from all around the U.S., Canada, and from abroad. Teams of educators from over a dozen states have attended center workshops, including Idaho, Washington, Wisconsin, New York, Virginia, and Ohio. The center has been featured in articles in national magazines and on national television. Based on participants' comments and remarks on their workshop evaluation form, schools across Michigan and the U.S. are eager to set up Teacher Explorer Center classrooms in their districts.

### What Is a "Teacher Explorer"?

We think a teacher explorer is a new kind of teacher: a teacher who is prepared to teach in a collaborative, technology-saturated classroom of the 1990s—and beyond. Teacher explorers are *learners* who are prepared to learn from a rich set of interactive media, from their colleagues, and from their students. Teacher explorers believe in their students and are willing to trust them to take most of the responsibility for learning. They are thrilled to lead their students—and equally thrilled to be led by them.

In the 1990s and beyond, students and teachers must collaboratively learn together and *teach each other*. In the classroom of the future, learning must be sustained at an intense, accelerated pace. The only way for this to happen is to engage every person in the classroom in the teaching process. Students must take responsibility for teaching

themselves and each other. Students must be recognized as "teachers of students" and "teachers of teachers." Student inservices must be held regularly to help students become better knowledge sharers, knowledge demonstrators and nurturers, and become adept at transferring skills efficiently and humanely to other human beings of all ages.

Just as in the corporation of the future, the classroom of the future must be flattened. The learning process becomes hobbled when new knowledge must be siphoned into the classroom through a single conduit—the teacher. Young people spend their lives in a world saturated with electronic images, sounds, concepts, and events. All that media disappears when they walk through the classroom door. In its place students find only a narrow trickle of talk and text emanating from the teacher and a textbook.

### Teaching in a Restructured Classroom

Why don't teachers get with it and catch up with the world outside their classroom door? Why don't teachers use more technology in their classrooms?

Teachers don't use technology because they aren't trained to use technology. Teachers assume that they can't begin using technology until they have studied it, mastered it, and feel comfortable managing technology in front of 20 or 30 students. According to a recent study by the Bank Street College, this process takes approximately five years.

Do teachers have to become techies in order to manage the high-tech classrooms of tomorrow?

No. This is a devastating myth—based on the present structure of teaching and learning in today's classrooms. It's a myth to think that *any single person* can manage technology as we move into the 1990s. Technology is a constantly moving, accelerating target. "Technology" used to mean computers. Now computers are converging with video, audio, publishing, entertainment, and telecommunications. In the 1990s, no single person can stay abreast of the multiple technologies that belong in every child's classroom. No single person can be the master performer, technician, impresario, mechanic, troubleshooter, and controller in a multimedia classroom of tomorrow.

So what can teachers do?

They can take a first step toward a new structure for classroom learning: *They can turn to their students.* Students make excellent technology technicians. I have seen hun-

dreds of student teams (as young as kindergartners!) take on the responsibility for managing technology in the classroom. Student teams can cable the machines together and uncable them when they are done. Students can manage the diskettes, operate the VCR, video cameras, and CD-ROM. Student-managed networks rarely have problems with piracy, network graffiti, and broken passwords.

Why do students make such adept technology aides? Because outside of the classroom students have spent *years* in Nintendo "boot camp," invisibly acquiring valuable skills in managing electronic equipment, cabling and reconfiguring the equipment to suit their needs, and designing and navigating through real-time multimedia databases (electronic games).

Teachers in the 1990s must learn to teach in technology-saturated classrooms. But that doesn't mean they should become techies. Students can become technology SWAT teams and take on most of the responsibilities for the setup, operation, maintenance, troubleshooting, and security of instructional equipment. Nintendo-trained students are technology aces, yet few schools tap students' vast untapped experience in this area.

And it goes far beyond Nintendo. Young people in the 1990s are like fish swimming through a sea of electronic media: Nintendo, MTV, Wrestlemania, Hollywood movies, 15-second commercials, Walkmen, Discmen, boom boxes, palmcoders, and the like. As "fish," students have acquired immense untapped visual and aural literacies and an unrecognized fluency in technology, electronic learning, and the emerging multimedia architectures of knowledge.

But on their own, students can go nowhere; they have no one to guide them. They are saturated with electronic media, yet they are trained only as passive consumers and not as *producers*. Left on their own, student producers will create shallow imitations of a pop culture that is all they know.

For students to use the new electronic tools to transform knowledge in science, history, mathematics, literature, etc., they must be led by *teachers*. Teachers can offer their students new vistas, new worlds of knowledge that transcend the narrow pop culture of the 1990s. Teachers are natural "scouts" to lead teams of student explorers in the transformation process. They love art, or they love literature, science, geography, or mathematics. Teachers also have years of classroom experience, professional

training, and a deep understanding of how real people learn in real classrooms. Students can join their teacher in a daily venture to bring the vital elements in the curriculum alive by transforming them into dramatic multimedia presentations, experiments, and simulations.

In the classroom of tomorrow, students and teachers must participate collaboratively as co-teachers, co-researchers, and fellow knowledge explorers and be prepared to teach each other and learn from each other *at every possible moment*. Only then can learning be accelerated and accessible to every person in the classroom the way it must be in order for mass public education to survive.

### What is a "Teacher Explorer Center"?

The Michigan Teacher Explorer Center (TEC) trains people to teach and learn in a restructured classroom of the future that uses the newest tools of cooperative learning, critical thinking, and desktop publishing; it is a move to a collaborative process where students and teachers work as equals to develop classroom instructional materials instantly and electronically using the latest "tiny tech" equipment. It is a human-centered environment in which everyone is encouraged to grow, be creative, and nurture each other's learning, development, and self-esteem.

The Michigan Teacher Explorer Center is also a school-business-government-university partnership that leverages relatively small amounts of cash funding into a much larger resource for Michigan educators. Over the last two years, the center has received a total of only \$110,000 from the state of Michigan. However, it has leveraged this amount into a state-of-the-art classroom and training center that occupies a three-room complex in East Lansing High School and boasts cutting-edge resources and support whose cash value exceeds \$1,000,000. This has been made possible through the in-kind support from Oakland University (concept, training, instructional design); East Lansing Public Schools (site host, administrative, logistical support); and 35 business partners (including companies such as IBM, Sony Showcase, National Geographic, ABC News, and Windham Hill Music, who are pioneering the emerging interactive multimedia curriculum).

### A Multi-Purpose Facility

A Teacher Explorer Center is a versatile,

cost-effective facility. School administrators have expressed interest in setting up Teacher Explorer Centers as *multi-purpose rooms* to accomplish the following critical district tasks:

**Staff Inservicing.** A training center for inservicing school-district personnel.

**Student Inservicing.** A training center to inservice students. Students then return to their classrooms and train fellow students and their teacher. This concept has worked with hundreds of students around the state of Michigan.

**Curriculum Lab.** Teachers can bring their class to the center to teach critical subjects. Teachers can use the center's advanced interactive media tools (including laserdisc, CD-ROM, computer-network, large-screen TV, telecommunications, etc.) to make classroom learning more exciting than MTV.

**Publishing Center.** Teachers and students sign up to use the room when it is otherwise not in use. *Teachers* create electronic curriculum materials that they can take back to their classroom and run on a standard computer or VCR. *Students* create multimedia databases, simulations, multimedia term papers, multimedia science projects, and dramatic classroom presentations.

**Preview Center.** The district acquires advanced new equipment and software on a temporary, "preview" basis for display in the Teacher Explorer Center. The district demonstrates these new tools to teachers, parents, and school board members and has valuable up-close, hands-on access to new tools before committing to their purchase.

**Continuing Education.** After regular school hours (evenings and weekends) the district opens the Teacher Explorer Center to train members of the community and local business employees. Training can be offered in:

- New publishing technologies
- New interactive training
- Desktop Video
- Interactive Presentations
- The Restructured Work Place
- Teamwork / Problem-Solving
- Multimedia Focus Groups
- Multimedia Databases
- Telecommunications
- Voice Mail / Multimedia E-Mail

The training is conducted by district teachers and students. The training provides additional income to the district for purchasing future technology and to help fund staff and student inservicing programs.

The "after-hours" use of the center gives the district round-the-clock use of the equipment and space dedicated to the center.

The center can be an invaluable on-the-job training laboratory for teachers and students to acquire practical skills in a real-world work environment of the future.

### Why Start a Teacher Explorer Center?

Why should every state department of education consider starting a model TEC in their own state? Because TEC offers a single facility that responds to the growing demand by districts to:

- Acquire new technologies for classroom instruction
- Merge the new technologies with the new learning strategies
- Update staff skills with new teaching tools
- Update staff skills with new teaching strategies
- Expose students to the work environment of the 21st century
- Provide powerful incentives to motivate at-risk students
- Restructure classroom learning

### Phase One

During Phase One (October 1989 through September 1991) the Teacher Explorer Center at East Lansing Public Schools has been engaged in five primary tasks:

- Prototyping electronic multimedia learning centers of the future out of equipment available to schools today.
- Creating a learning environment in which these learning centers are at the core of a process that includes:
  - Cooperative learning.
  - Whole-language learning.
  - Critical thinking.
  - Multimedia authoring.
  - Thematic learning.
  - Students taking responsibility for classroom learning.
- Monitoring the environment to see if the outcome is a learning experience in which students (workshop participants) consistently learn both content and tools better, deeper, and more quickly than ever before.
- Creation of a "flattened" classroom in which teachers and students have equal responsibility for teaching each other and for exploring knowledge in the most engaging, intense, and accelerated manner possible
- Development of a model curriculum

entitled "What Is a Hero?" This curriculum has already been tested on over 2000 Michigan teachers, principals, school library media specialists, district superintendents, etc.

Phase One has been jointly sponsored by the Michigan State Board of Education (seed money), East Lansing Public Schools (site, in-kind support), and over 35 business partners (equipment, resources, technical support).

### Phase Two

The demand for the Teacher Explorer Center's six-hour workshops during Phase One has been extraordinary. During Phase One we learned that there is national interest in the Teacher Explorer Center concept. We learned that the center is a viable, accessible method for infusing new technologies and new, nontraditional teaching and learning strategies into today's classrooms.

Now we are ready for Phase Two, creating curriculum templates to help districts interested in implementing Teacher Explorer Classrooms in their schools. Here is Phase Two's three-year schedule:

- Year 1*—Create teacher-designed curriculum templates.
- Year 2*—Test/refine templates.
- Year 3*—Publish templates.

By the end of Phase One (September 30, 1991) we will have created a cadre of over 2000 "teacher explorer" teams who teach in over 134 Michigan school districts and in over a dozen other districts from around the U.S. During Phase Two we will continue to work with a self-selected group of these teams to develop model curricula across core subjects (language arts, math, science, history, and geography), ranging from kindergarten through the 12th grade.

In order to create these teacher-designed curriculum templates, during year one we will invite teacher teams back to the Teacher Explorer Center in East Lansing for in-depth curriculum production workshops. We will refine the materials created during these workshops and send them back to the teachers after they have returned to their classrooms. Later on we will invite the teachers back to the Teacher Explorer Center to participate in all-day multimedia seminars to report on how they have modified, elaborated on, and enriched their curricula. We will also make site visits to key "explorer classrooms" to closely follow the teachers

and students who are using the materials and to provide valuable on-site training and technical assistance.

### Two-Way Support

During Phase Two of the development schedule we will work closely with a select group of *Explorer Classrooms*. The teacher teams at these explorer classrooms will participate in Phase Two by helping the Teacher Explorer Center:

- Develop curriculum templates
- Test the templates

The Teacher Explorer Center will help the teacher teams at the Explorer Classrooms. The center will:

- Provide training materials to upgrade teachers' skills
- Provide technical support to the teachers
- Enhance teachers' curriculum templates
- Coordinate a support network of teachers who are actively using the explorer center model
- Publish and share the curriculum templates among all the teachers on the network

This will result in a two-way support system operating between the Teacher Explorer Center and the classrooms active in implementing the teacher explorer model.

The outcome at the end of Phase Two will be a collection of curriculum templates bundled together into a *multimedia starter kit* that will be distributed to schools across Michigan and the United States as a "first wave" of teacher explorer classrooms who have participated in the development and testing of the starter kit. These sites will have contributed in a major way to: Pilot testing, Follow-up, Evaluation, Revision, and Expansion of model to new sites.

### Follow-Up / Evaluation

Oakland University, in Rochester, Michigan, will develop an evaluation component for the center's starter kit, including all templates, training materials, development methods, teacher seminars, and curriculum workshops. They will create this component as an in-kind contribution to the Teacher Explorer Center project.

### Summary

School districts, business partners, and state departments of education around the

U.S. should join with the Michigan Teacher Explorer Center to create TEC classrooms in every state. These facilities would be an inexpensive way to hasten school restructuring and the adoption of new technologies for classroom instruction, and would dramatically increase the motivation of marginal, at-risk students.

### Invitation

We would like to invite educators, business people, and educational policy makers from around the United States to visit the Teacher Explorer Center in East Lansing or one of our sister centers at Oakland University in Rochester, Michigan, or at Bay de Noc Community College in Escanaba (Upper Peninsula) Michigan.

For more information about all three Michigan Teacher Explorer Centers, please write Sharon Goth-Tew, administrative director of the Teacher Explorer Center, East Lansing Public Schools, 509 Burcham Drive, East Lansing, MI 48823, or fax us at 517/337-8171 or 517/337-6434.



[Fred D'Ignazio, 1302 Beech Street, East Lansing, MI 48823.]

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## Paper Training Sparky The Dog

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**We like to impress ourselves with our use of technology. But often we're just pushing virtual paper.**

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The other day, I attended a speech given by a nationally renowned demographer. At the end of the speech, I had the opportunity to talk with him for a few minutes. I introduced myself as a technology writer, and the demographer nodded, saying he used a computer every day. His profession, he said, tracked large groups of people—their movements, their aging, and their behavior—and he considered the computer to be his single most valuable tool. On the other hand, he was alarmed by the pace at which new, more powerful computer chips were being introduced. “All I need,” he said, “is enough power to crunch my numbers and store and manipulate some data. And I’m a demographer. Who could possibly need more computer power than I?”

As a multimedia enthusiast and computer educator, I was stunned. It took me a few minutes to summon enough courage to respond to his challenge. “Excuse me, sir,” I finally said. “If you’ll get in my car, I could drive you down the road to a local elementary school and show you some fifth graders doing a multimedia history project for our college museum who are desperate for more computer power.”

“What could they possibly be doing?” the demographer asked.

“They’re part of a multimedia detectives project which gathers nontraditional resources to research historical mysteries. As part of their research on the Civil War, they’re digitizing recorded voices from Civil War soldiers and ex-slaves. They’re scanning in photographs passed down over generations by their families. They’re videotaping live reenactments of dramatic events and personalities from the war. They’re orally narrating eyewitness ac-

counts of the war written by women, blacks, Southerners, and soldiers. They’re digitizing artifacts from the war uncovered in family attics. They’re interviewing local historians and pulling in pictures and sounds from libraries on the Internet. They’re . . .”

“Enough!” said the demographer, smiling. “You made your point. Maybe I should come see what these fifth graders are up to.”

### Multimedia Cuisinarts

We adults, like the demographer, live in a world of text (numbers and letters), and we are tickled pink with the way the computer zips along shuffling our words, sentences, and columns of numbers. But we are almost unaware that a new age of knowledge is dawning in which computers will be required to push around digitized movies, voices, beautiful paintings, and symphonies as well as words and numbers. Knowledge processors of the future will have to be Multimedia Cuisinarts that take images, sounds, and numbers and slice them, dice them, blend them, and puree them. To do this in real time, they will have to be far more powerful than the wimpy little word processors most adults are using today.

### A Narrow Trickle of Text and Talk

In my multimedia speeches and demonstrations, I spend just as much time running up and down the auditorium aisles, Geraldo-style, as I do pressing buttons and switches up on stage. Since I am probably 75 percent clown, it seems natural in my speeches to turn my body into a comic, visual metaphor.

"It's so hard," I tell audiences, "for us adults to see things through the eyes of our children. "We grown-ups are hooked on words. And, as the older and presumably wiser human beings in any room, we're great at frontal lecturing. We stand in front of young people and become a fountain of words, a stream of words, spoken one at a time, dribble, dribble, dribble, pointed at their young ears.

"We assume that if enough young faces are pointed back at us, the stream of words is flowing between their ears into their brains, and we conclude that learning has taken place. But we're fooling ourselves. As good teachers already know, teaching isn't talking, and learning isn't listening—especially when your learners are all fish."

That's the point when I jump off the auditorium stage and go running up and down the aisles, arched forward, my hands folded together like the prow of a ship. "Our children," I say as I run, "are fish swimming through a sea of electronic media. This is their world of knowledge, their habitat. And then each morning they are tossed through their classroom door into our world of words. No wonder they thrash and struggle! They can't breathe! They are like fish beached on a dry, arid shore. We try to help them, but all we can offer is this narrow trickle of text and talk."

(I point my "ship" down a new aisle and run even faster, my hands pointed forward.) "Text and talk," I say, weaving back and forth, "text and talk. We think we are nourishing our children, and all the while they are suffocating."

### Cultural Blindness

We are not doing this on purpose. Most of us adults are *not naturally mean*, despite what many kids think. We really are people of good will. But we may be terminally blind.

As with any cultural transformation, the inhabitants of the old culture (the world of printed words) can't see the new culture coming. And the inhabitants of the new culture (electronic media) can't understand why most of their world is so foreign to the older people they see everywhere around them.

Let's face it, we big people love books. We have spent our lives in the company of books. If you added up all the books we've stuck our noses into, you'd be amazed. Even worse, add up all the inches of text we've followed, line after line, page after page, as we've read books over 20, 30, or more years! We've spent our lives in "book school" learning this simple equation: KNOWLEDGE = BOOKS. And school is the center of this theory of knowledge. The specialists of book-centered knowledge teach in the schools. Their methodology is straightforward: If you want to know something, find it in a book.

### Enter Sparky the Dog

And what are books made of? Paper!

This is where I whip out a newspaper and throw it onto the floor. I fall to the floor and begin happily sniffing the newspaper, nuzzling it and talking to it in dog language. It's clear that I really love this newspaper!

As I'm scurrying around on the newspaper I continue talking. "I'm an author," I say between barks and snorts. "That means I love words. I adore paper. In fact, you might say I'm paper trained."

At this point I act as if I'm being led away from my paper on a leash. I resist the leash and gaze back longingly at the newspaper. I whimper and yip pathetically as I am dragged away from my paper. "I can't stand being away from paper," I say between growls and moans. "If I have to leave the world of paper I get anxious and uncomfortable, like Linus being separated from his beloved security blanket."

I pretend I yank my head so hard that the leash snaps. I am now 20 feet away from my newspaper on the other side of the auditorium stage. Joyously I scamper on all fours back to the paper. I plop down on the paper and wag my tail against the paper. "Ahhhh," I say with a big doggy grin on my face. "Paper... mmmmm... I am so relieved."

### I Am So Confused!

I jump up. I'm a human again. "I may be the silliest Sparky the dog in the room," I say, looking around the auditorium. "But I'll bet I'm not the only one who is paper trained. And this paper training is shaping up to be a serious disability in the world of the future, as knowledge is packaged in new nonpaper formats. We book lovers may feel very strange in a world where knowledge no longer comes on paper, neatly and politely, one word at a time, but instead is crammed inside a shiny silver platter or whizzes onto our TV sets and computer screens from libraries and databases around the world, under the seas, or from outer space. This is a brave new world for Sparky the dog!"

Then I show a video from the MCI Corporation which talks about the Internet and hypermedia libraries of the near future. An actor dressed as a Renaissance scholar lights a candle and enters into the darkened library while classical music plays in the background. He wants to look up information about Columbus' voyage to explore a new world. A modern woman, the librarian, tries vainly to help him, talking about hypertext and multimedia archives stored in "infinite digital preservation in real-time." But the poor man shakes his head, bewildered, and says he'd love to understand the new scheme for knowledge, but he fears he will be in his grave before he learns to navigate through this new world.

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**Let's face it, we big people love books. We've spent our lives in "book school" learning this simple equation: KNOWLEDGE = BOOKS.**

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**We have to decide  
really soon  
whether we are  
really in love with  
books (the  
comfortable old  
“wrapper”) or  
with the ideas, the  
life stories, the  
treasures found  
inside.**

---

We are this old man. All our paper training has left us quite unprepared for the new ways in which knowledge will be packaged, dished up, and devoured. We have to decide really soon whether we are really in love with books (the comfortable old “wrapper”) or with the ideas, the life stories, the treasures found inside.

But there is hope. The trick is to take the first baby step into this brave new world of our children. Or is it really a “step?”

#### **“Do-It-the-Hard Way Fred”**

I tell the audience about my challenge by a Florida educational TV producer, Jane Matheny, to transform my “paper” metaphor of children swimming through a sea of media into a physical real-world metaphor.

One spring morning, with Jane and her camera person David at a Florida poolside, I stripped off my clothes to my swim trunks and revealed my not-so-Schwarzenegger torso underneath. While I was disrobing I talked about the sea of media which represents the world of knowledge in the future.

While I was spouting words, I was in my medium. But now I had a problem: I was supposed to keep talking and *also* jump into the pool! (Kind of like walking *and* chewing gum). This is not a hard problem for many

people, but for a person nicknamed “Do-It-the-Hard-Way Fred,” it was a fearful challenge.

Seventeen film “takes” later and after nine painful bellyflops, the producer said she’d had enough. With some skillful editing, the video segment eventually aired on Florida public TV. The shoot at poolside was only supposed to take half an hour, but the producer hadn’t counted on all the times I would get water up my nose while I was pretending to be a “child swimming through a sea of electronic media.” Choking and coughing I would rise from the water like a whale breaching, and we’d have to do the whole thing all over again, starting with another belly flop.

It was almost the end of me! But the piece was a success. In it I asked teachers to come with me and “jump into this new sea of electronic knowledge.” We may almost drown, I said, and we may have to leave our paper high and dry on the shore, but the time has come for us to decide. In the multimedia world of the future, who will be our role model? Will it be Willy the whale who leaps to freedom, or good old Sparky the dog? ■

[Fred D’Ignazio, 4121 Okemos Road., Ste. 24,  
Okemos, MI 48864; E-mail: [explorer00@aol.com](mailto:explorer00@aol.com).]

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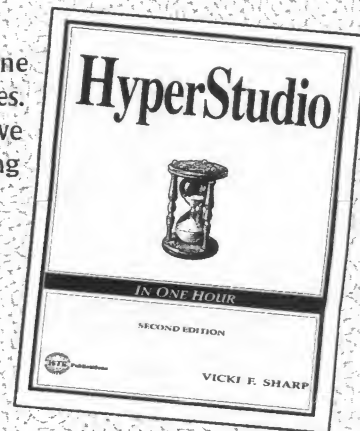
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# *Are We Missing the Boat?*

## PART THREE: OUR READERS RESPOND



*By Fred D'Ignazio & Catie D'Ignazio*

*This series has generated a terrific response!  
Catie and Fred continue to receive letters from our readers,  
and they hope to publish excerpts from the more  
positive letters in a later column.*

If you have been following this series, then you know we have tackled a tough subject, and many teachers have been frank in describing their situations. They're proving that integrating technology into daily classroom teaching and learning isn't easy.

Despite the obstacles, many of you are experiencing success, even if slowly and incrementally. So please let us hear from you. Don't be modest. Tell us about even your tiniest victories. Share your frontline know-how. What teaching practices are working for you and might work for others? How have you found support in the classroom, your building, and your district? How have you justified the expense and hassle of technology to other teachers, parents, and school administrators? How have you overcome the roadblocks—the lack of time, money, and training—that cripple most teachers' pushes into new technology? Please share your encouraging stories. Every teacher who takes a tiny step forward brings us closer to a new age of teaching and learning.

In the previous columns in this series, we whined, crabbed, and complained. Now it's time for some bragging. Catie and I are the peanut gallery and eager to applaud your efforts and celebrate your accomplishments. Let us hear from you. Write to Fred at [dignazio@msen.com](mailto:dignazio@msen.com) and Catie at [catiedig@ix.netcom.com](mailto:catiedig@ix.netcom.com).

### Librarians Respond to Catie's Letter

Dear Catie:

If you've accomplished anything with your letter, it has prompted my first response to any type of column or article in any sort of publication.

I, too, am a "librarian" (many of us prefer to be called media specialists or information specialists these days). I have set up an electronic research center in our media center. We have 12 computers dedicated (horror of horrors) to electronic research. Perhaps it is in our blood, but I also get very testy when students or staff

come in and just sit down and begin using the computers. All I ask is the common courtesy of asking if it is OK to use the computer. There is a good chance that the computers have been loaded with software that is going to be used by students or teachers who have reserved them for a class period. I have also discovered that many of the people who pretend to know their way around a computer can create a lot of havoc which I then have to straighten out.

Please don't forget that you've grown up in the computer generation. They are second nature to you. Most classroom teachers today with 10 years' or more experience have basically had computers thrust upon us. And I would guess that the school district in which I have taught for the past 29 years is fairly typical of districts around the country. We have spent a great deal of money on hardware (but not nearly enough to keep up with what the community expects us to teach our children). We have spent a lesser amount of money on software. And we have spent a considerably lesser amount of money on staff development. It is getting better all the time, but staff development is the weak link in the use of instructional technology. . . .

[T]here are some teachers who fear computers. I believe that I recently read that approximately 40% of the general public still has a fear of computers. Why should this percentage be any different for teachers? We should be working with those teachers rather than publicly ridiculing them.

I would strongly encourage you to spend at least five years as a classroom teacher. Only then can you begin to know the frustrations of today's classroom teacher. Even for those of us who have chosen to learn as much as we can about instructional technology on our own during the past 18 years, it has been a real struggle.

Jim Bogart  
Library Media Specialist

Hi, Fred and Catie,

As a library media teacher myself, I shudder every time I hear of another story where the old-time librarian once again reinforces the stereotypical librarian's job of telling people what not to do!

I would also agree that fear is the leading cause of so many teachers and administrators not embracing technology and specifically the use of computers and the Internet. Why is it that so much of what goes on in schools is governed by fear? There is a universal concern that if using technology does not increase standardized test scores, then the investment should not be made in technology. I, for one, will be glad when this pervasive feeling dissipates!

Our district has made an investment in laptop computers so that there are at least six laptop computers in each of 24 block (language arts and history) classrooms. In addition, more than 180 students have purchased their own laptop computers and use them daily in their academic block, math, and science classrooms.

Students in the "immersion" laptop classes are creating PowerPoint presentations to demonstrate their knowledge of science concepts. In the nonimmersion classes, teachers are utilizing the laptops in similar ways, usually grouping at least 16 computers together so that there is at least one computer for every two students.

In the library media center, there are 20 computers that go out on the Internet. These are used constantly by various classes collaborating with me for a variety of projects. Every class through the library media center this year has utilized the World Wide Web for searching and finding information. Then this info is synthesized into some type of project. The ultimate learning for these seventh- and eighth-grade students is how to utilize search mechanisms and find information on the Web. . . .

[Y]ou can see our Web site at [http://www.clovisusd.k12.ca.us/dist/sites/inter-snd/alta/lmcvirtual/Virtual\\_Tour.html](http://www.clovisusd.k12.ca.us/dist/sites/inter-snd/alta/lmcvirtual/Virtual_Tour.html).

Rob Darrow  
Library Media Teacher

## Give Teachers a Chance!

Dear Catie,

Computers certainly have had an impact on the classroom. My students now compose, edit, print and present their compositions of all kinds on the computer. Teachers are scared to be creative, sometimes, not because they don't want to be, but because they're scared of the technology. Give old teachers like me a bit of time and practice and I'll be more daring to be more creative myself!

Margaret Korany  
Teacher

Hi, Catie,

I feel that teachers' inhibitions stems from their lack of knowledge. Their fear of the technology is basically a fear of the unknown. Give them the opportunity to learn more about computers. . . .

Agnes Pascale  
Teacher

Catie:

Why didn't you tell the folks at the school (the librarian) who you were and your background before you started to explore around on their machine? Isn't it the polite thing to do?

Mark Devlin  
Teacher

Dear Catie,

Your reaction to your experience with the school librarian in charge of the computer lab at your sister's school was rather harsh. Teachers are always learning new programs or new methods that they can convey as best they can to their students. Technology has not brought fear to me, nor do I feel that I need an expert, a guru, to guide me through using the computers. What we teachers need is time, lots of time, for us to learn from other teachers, from students, or computer technicians. We need time to learn and time to practice. . . .

Cathy Lynam  
Teacher

Dear Catie,

I understand your perspective. However, I can also empathize with the librarian who was afraid of having a network crash and not being able to fix it. If your interest in the computers was beyond the demonstration provided, perhaps you could have discussed this with the librarian afterward. . . .

Teachers and staff who are responsible for their computers cannot be open until they are confident and comfortable with their own use of computers.

Anita Watson  
Special Education Teacher

Dear Catie,

I think that you are right. Most of the time people in the school are afraid to use computers in other ways. They stick to the network server and don't want to go further. But from what I see now in our schools, there is a new line of thinking. We are in a process of changing the way we use computers in school. Teachers are taking computer courses and they are learning to lose their fear of the computers. I think that we should let the students explore the computer to get the most out of it. The computer is one of the few tools that really captivates their attention, so give them the chance.

Josee Giroux  
Teacher

## Expensive Equipment Makes Teachers Cautious

Dear Catie,

Recently we had new computers installed in our classroom, which are a nice addition. Most of the teachers in my school would love to have computers in their classrooms, as long as the proper training to go along with the equipment comes, too.

I think part of the fear aspect is the cost factor involved with computers. Teachers do not want to be held accountable if the computers are ever broken. . . .

Mike Dagenais  
Teacher

## Technology Is Impossible Without Support

Catie,

I, too, have had similar experiences with administrators and with a librarian who squelched student and staff experiences with technology, based on a fear of the unknown and a lack of desire or incentive to learn technology's benefits. . . .

I recently left the classroom to become a technology coordinator for a small rural school district. My job description included maintaining the file servers for the district, maintaining an inventory of equipment, troubleshooting and repairing equipment, purchasing and upgrading the current equipment, keeping up-to-date on new trends, training staff and students, etc. One week after I was hired, the district fired the superintendent. The high school librarian refused to give me the password for the file servers. Although he couldn't fix a simple computer problem, he mandated what could be done with the computers in the library, and what the students could or could not do.

My office was in a storage shed for cafeteria supplies, with no network capabilities, no access to communicate with teachers, etc. After firing the superintendent, the board decided to have the elementary/middle school principal become my supervisor. He had absolutely no technology background. I had no budget, no ability to even perform the job description that I was hired to perform, and no power to stop the high school librarian from mandating policy that did not benefit the students or the staff. I informed the board, in executive session, just what had been taking place, and I told them that I would not be returning. . . .

[A] lot of quality educators leaving the schools because they are not allowed to be creative and do not receive support for the time and effort they put into their profession.

Karen Needles  
History Teacher and Technology  
Consultant

*Continued on page 61*

Continued from page 57

## Students and Staff Must Collaborate

Dear Catie:

Progress in computers takes time. Why? Because of the many different, unique schools and the many different individuals who are still not convinced of the use of technology in education. . . .

On which grounds can we orient ourselves? Nothing from the past acts as a guide to establish boundaries, so what is left? Confidence in achieving realistic goals that will serve every learner and hope that the staff gets involved with more enthusiasm.

Anna Belleau

Teacher

Dear Fred and Catie,

I have been working with computers in the classroom for approximately 10 years and have owned three different models over the same period of time. My personal belief is that computers should be an integral part of every classroom. Currently I am working in a small program for secondary students who have been pulled out of the traditional school setting for a variety of academic and behavioral reasons. For 28 students we have eight modern computers (less than three years old) and a couple of older Macs. . . .

For a number of students, having access to the computers means that they come to school early and stay several hours after school playing games on the computers, going on the Internet, and working on projects. The computers have become the hook for some of these students. We have a couple of students for whom the consequence for misbehavior means not being able to stay after school!

Connie Brownell

Teacher

## Computers Are a Struggle, but Worth It

Dear Fred and Catie D'Ignazio,

I have taught [G]rades K-6 and find with each new school year the class of students I have are consistently more computer literate. As for myself, I am always interested in improving my computer knowledge, but

I am far from the makings of a computer lab teacher. I find frustration and great amounts of time spent in front of the screen. At times this does little for maintaining my motivation, and perhaps I don't possess enough logic-oriented thinking, making me less compatible with the computer. I realize time is essential for success, and I follow through with what I begin. However, the facility and patience children have in working out computer bugs is a skill I am still hoping to master.

Kim Wittin

Teacher

Dear Catie,

I am a teacher at the elementary level, and like so many other teachers I am presently updating my computer skills so that I can better help students in the classroom. I find computer technology fascinating, exciting and a *great* struggle, all at the same time. . . .

Our class has a computer and a printer that we use on a daily basis. I find it amusing that whenever I ask the class to write a composition, they usually groan and work at a snail's pace. When the same work is assigned on the computer, the work is not only completed with all the bells and whistles but also with time to spare. There is no doubt that computers are a motivating force for learning and here to stay.

Helen Turcay

Teacher

## New Ideas: How About Laptops and Graphing Calculators?

Dear Catie,

Our school has a computer lab with 27 computers. Each class has been scheduled for a period of one hour a week. In addition, each classroom has one computer and printer. In theory, we agree with your point that schools have not adopted computer technology in effective, instructive, and innovative ways. However, the reality of the classroom is that there are a minimum of 25 children, that their experience with computers covers a very wide range, and access to the lab is limited to one hour a week. Using computers in the classroom requires

a very different approach to teaching, and not all of today's teachers are comfortable with the use of computers yet.

Millions of dollars have been spent to this point, but it is just a drop in the bucket! Millions more need to be spent. Wouldn't a laptop per student be almost perfect?

Judy McPhee

Donna-Leah Walker

Teachers

Hi, Fred,

I have found that the classroom technology of choice for high school mathematics consists of:

- A TI-83 graphing calculator in every kid's hand
- Enough CBL equipment shared among classrooms so that groups of four students can perform occasional experiments
- A multimedia presentation system for every classroom
- A lab where students can get access to the software the teacher shows

The problem is that computers never did get cheap enough to provide access to all, although NetSchools is indeed an intriguing idea. The graphing calculator . . . has become . . . the affordable tool for everyone. But the issue about computers is not just price, it's size, and you know that there's just not enough space in the classroom for all that technology, even at two or three to one.

I am negative about the Internet as the source of all education. . . . I don't fear pornography. I fear 70,806 hits on the word "dinosaur". . . . I don't like to see books underestimated as a tool for learning.

Sandy Wagner

Menlo Park, CA

*Note: Sandy started using personal computers in his classroom in the 1970s. In 1978, he founded Computer-Using Educators—California (CUE).* ■

*Fred D'Ignazio, dignazio@msen.com;*

*Catie D'Ignazio, catiedig@ix.netcom.net*



Glen Bull (GlenBull@virginia.edu) is an associate professor of instructional technology in the Curry School of Education at the University of Virginia. You can contact him at

Curry School of Education, University of Virginia, Charlottesville, VA 22903.



Gina Bull (GinaBull@virginia.edu) is a computer systems engineer in the Information Technology and Communications organization at the University of Virginia. Contact Gina at Information

Technology and Communications, University of Virginia, Charlottesville, VA 22903.



Dave Lewis (DLewis@virginia.edu) is a programmer analyst in the Curry School of Education. Contact him at Curry School of Education, University of Virginia, Charlottesville, VA 22903.



Donn Ritchie is an associate professor at San Diego State University. He also coordinates the teacher training laboratory. Contact him at Department of Educational Technology,

San Diego State University, 5500 Campanile Dr., San Diego, CA 92182-1182; fax 619.594.6376; dritchier@mail.sdsu.edu.



Karen Boyle is a graduate research student in San Diego State University's Department of Educational Technology. Contact her at 6466 Friars Rd. #106, San Diego,

CA 92108; kjoybole@ix.netcom.com.



M. D. Roblyer (mroblyer@westga.edu), *L&L*'s Research Windows editor, has been an educator, researcher, and author in educational technology for 25 years. She is currently a

professor of educational technology at the University of West Georgia. Her work includes *Integrating Technology Across the Curriculum* (Prentice Hall/Merrill, 1998) and *Assessing the Impact of Computer-Based Instruction* (Haworth, 1988).



Fred D'Ignazio (dignazio@msen.com) has written 25 books on science and technology and conducted multimedia training workshops in school districts in North and South

America, Europe, Asia, and Australia. He is currently principal of MUD Pie School ("Multimedia U Design") (www.mudpie.org/mudpie.htm). Contact him by phone at 517.332.8896 or fax at 517.332.9378.



Catie D'Ignazio (catiedig@ix.netcom.com) is a Web developer for Ivy Productions, Inc., and moonlights as a freelance Web designer, visual artist, and consultant in

educational technology with her father, Fred D'Ignazio. In the past year, Catie and Fred have conducted workshops from Washington, D.C., to Avalon, Australia.



Judi Mathis Johnson (73517.2107@compuserve.com) has edited software reviews for 10 years and the *Educational Software Preview Guide* for six. She is Virginia's higher-

education representative to the SEIRTEC advisory board, and she directs the ENC Access Center for Southside Virginia. Contact her at 2749 Birdsong Ln., Powhatan, VA 23139; 804.598.6138.

## GUIDELINES FOR SUBMISSION OF ARTICLES

The articles in *Learning & Leading With Technology* are written by practitioners in the field of education. Those who contribute to *L&L* are making an extra effort to share knowledge that can improve education through the use of technology. *L&L* would not exist as a professional journal without our authors' willingness to share their expertise.

We are looking for practical ideas for using technology where it can make a difference—making a teacher's job easier; saving time; motivating students; helping students with varying learning styles, abilities, and backgrounds; and creating educational environments that are new and unique or that would be impossible without technology. We also publish practical articles about technology coordination and staff development.

Guidelines for submission of articles to *L&L* are posted on the *L&L* Web site at [www.iste.org/L&L/](http://www.iste.org/L&L/). To request a printed copy of the submission guidelines, contact Acquisitions Editor, Anita Best (Anita\_Best@ccmail.uoregon.edu; 541.346.2400) or write to ISTE, 1787 Agate St., Eugene, OR 97403-1923.

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# The Teacher Explorer Center: Providing Techniques & Training in Multimedia Instruction

by FRED D'IGNAZIO, Director  
Teacher Explorer Center  
East Lansing, Mich.

In the fall of 1989 Michigan's Department of Education awarded a grant to East Lansing Public Schools to create a Teacher Explorer Center (TEC) as a model classroom of the 21st century. The center is co-sponsored by the state's Department of Education, East Lansing Public Schools and Ingham County Intermediate School District.

Over the next several months, the TEC staff contacted dozens of technology manufacturers to see if they would become business partners. By the beginning of March 1990, 27 firms had agreed, pledging a total of more than \$1 million in resources to the center. Three companies in particular contributed substantially: IBM Corp.'s Lansing branch office; Sony Showcase, a Lansing-based audio-visual equipment company; and Data Image, a Midland, Mich. firm specializing in computer-projection products for the classroom.

## The TEC Model

During March and April 1990 the Teacher Explorer Center received several shipments of equipment from its business partners. East Lansing Public Schools, under the leadership of its district data services director, Larry Freds, donated a complex of two classrooms and an office plus furniture, utilities (including air conditioning for the summer workshops), room renovation, administrative and custodial support, and technical and manual help in constructing the center.

In April a flyer was sent to 75,000 Michigan educators and the TEC began registering teachers for its spring and summer six-hour training workshops.

On May 21, 1990 the TEC conducted its first workshop. The five teams of teachers and administrators who attended this inaugural workshop, and all

succeeding workshops, came from school districts across the state. During the weeks that followed, an additional 500 Michigan educators attended the center's one-day workshop. And 97 percent of those who received training said they found it to be "valuable" or "extremely valuable." To date, the TEC has received requests for training from over 4,000 teachers representing almost one-fourth of Michigan's school districts.

## Expanding Influence

The Teacher Explorer Center has received publicity from all over Michigan, from around the U.S. and from abroad. Television crews from local and national news programs have visited and the TEC has been featured in numerous newspaper and magazine articles. Inquiries come from as far away as Ireland, Australia, the United Kingdom, Canada and Mexico.

Based on the huge statewide demand for the TEC's workshop, the State Board of Education recently voted to renew the grant to the center for another year (October 1, 1990 through September 30, 1991). Under its new grant the TEC can expand its training program from two to five days per week, add multimedia telecommunications strategies to its curriculum, and help two "sister" explorer centers get started in other parts of the state.

The TEC's sister centers—Oakland University in Rochester, Mich., and Bay de Noc Community College—received funding from the State Board of Education in mid-November of 1990. The new centers will specialize in teacher training; in undergraduate, preservice teacher instruction; in vocational training; in continuing education; and in reading instruction. All three centers are already conducting an interactive



A TEAM AT ONE OF THE MULTIMEDIA R&P CENTERS

exchange via modem. In the future they hope to offer two-way telecourses via satellite, cable and fiber-optics. And the three are actively recruiting new school districts, regional training agencies and institutions of higher education to join an expanding *network* of TECs. The Michigan Department of Education hopes that by the mid-1990s there will be a cluster of Teacher Explorer Centers regionally distributed across the state running teacher-training courses for preservice and inservice teachers.

## Key Teaching Strategies

The Teacher Explorer Center is organized around five key teaching strategies for the 1990s:

- cooperative learning;
- critical and creative thinking;
- classroom publishing;
- thematic “whole-language” inquiry; and
- learners taking responsibility for their learning.

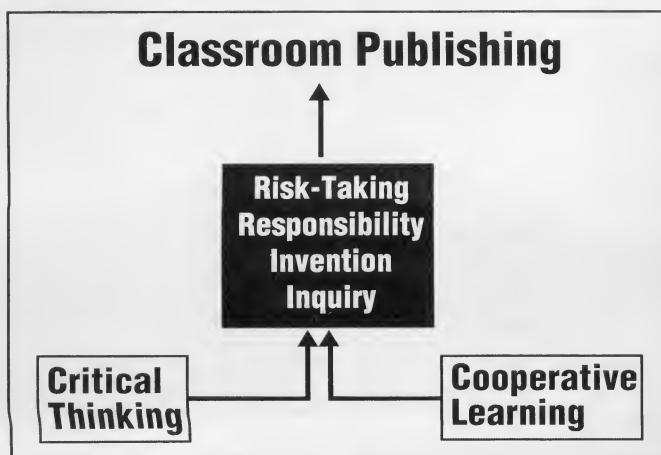


FIGURE 1: TEC'S CORE STRATEGIES

Figure 1 graphically shows how these strategies relate to one another. To implement them, the TEC has five “multimedia research and publishing (R&P) centers” around the classroom. Each R&P center is utilized by a team of four participants for instant multimedia publishing. Each R&P comprises:

- two computers;
- a videodisc player;
- an audio CD player and a CD-ROM drive;
- a VCR;
- a TV;
- a video-capture card;
- a camcorder;
- a microphone; and
- an audio-capture card.

In addition, all R&Ps are tied via a Token Ring network to a laser printer, a color dot-matrix printer, a scanner, a 600MB file server and a CD-ROM optical server. Every educator team has instant access to resources that include Grolier's Electronic Encyclopedia, World Book's Information Finder, Microsoft Bookshelf, National Geographic's Mammals and, on a stand-alone server, Britannica/Compton's MultiMedia Encyclopedia.

The TEC maintains a sizable CD library containing dozens of audio CDs from sponsor Windham Hill Records, as well as other discs that offer thousands of songs, speeches and sound effects. The center also has a library of 12" videodiscs including all 40 volumes of The Video Encyclopedia of The 20th Century; five sets of the Martin Luther King Jr. disc; WGBH-Nova's Pathfinders; National Geographic's GTV; science discs from Optical Data Corp. and Videodiscovery; classic movie, art, and literature discs from The Voyager Co.; the National Gallery of Art disc; Scholastic's Hurricane Hugo; ABC News InterActive's The '88 Vote, In the Holy Land and For All Mankind titles; plus many more discs that teach science, literature, social studies, art and world affairs.

In addition, several advanced audio, video and computer-display technologies are demonstrated at the TEC. These include:

- MIDI keyboards to create audio environments for learning;
- Audio-capture cards to add sounds to student publications;
- Powerful, miniature, amplified speakers;
- Surround-sound audio for “swear-you-are-there”;
- Video “wallpaper”;
- CoVid 123-A VGA to S-Video converter;

*(continued on page 92)*

## Explorer<sup>(continued)</sup>

- Sony 41" rear-projection, S-Video monitor;
- Sony face-to-face digitizing video telephones;
- Sharp XV-100 liquid-crystal video projector;
- Epson Crystal Image video projector;
- Proxima MultiMode LCD data display;
- Dukane portable overhead projector; and
- 3M Model 4080 color LCD data display.

### Expectations vs. Reality

Every educator, parent, community leader or policymaker is eligible to visit the Teacher Explorer Center and take its one-day training workshop. (The Michigan State Board of Education grant enables Michigan educators to attend the workshop for free.)

After the workshop ends, participants fill out an evaluation survey in which they critique the six-hour program and rate their experiences. The first question in the survey asks, "What did you think the Teacher Explorer Center would look like before you entered the room?" The second question asks, "What did you expect to learn before you entered the room?"

In the past, participants' answers to these questions were a real eye-opener! Most teachers had no idea what to expect. Many expected the TEC to look like a futuristic movie set, something straight out of "Buck Rogers." And almost no one anticipated the real thing: an almost-ordinary, high-school classroom with normal high-school tables and chairs organized as cooperative-learning centers in a circle around the room.

Almost everyone also expected the day to be a series of glitzy presentations on "the classroom of the future." Again almost no one anticipated that teachers were expected to roll up their sleeves the moment they arrived and dive right into a team-publishing project to make a videotape to take back home.

To prepare teachers for their day at the center we now send out a "What to Expect" flyer. We also give each team a "room map" showing the teacher in the center of an inquiry-driven classroom that is powered by student teams using high-tech tools to perform multimedia research, investigation and publishing. The teacher functions as an explorer, a content specialist, a learning specialist and a resource expert in this new type of classroom.

We have designed the one-day workshop around vertical teams composed of one administrator and three teachers. At the beginning of the workshop we ask teachers to look for things they can do *now* back in their own classrooms. And we ask the administrators to think *strategically* about how they can train their teachers, purchase new technology and plan new learning environments for the 1990s and beyond.

## Strategies for Getting Started

Getting started is often the hardest part in any endeavor. At the East Lansing TEC, each team of workshop participants is given a Starter Kit that contains, among other things, a strategy for setting up four different levels of multimedia classrooms:

**Level One: Do-It-Yourself Classroom Learning Center**

**Level Two: Teacher Presentation Center**

**Level Three: Multimedia Training & Publishing Center**

**Level Four: Teacher Explorer Center**

The kit describes each level in great detail, but in general, Level One is the quickest and least expensive way for a school to get started while Level Four is the most time-consuming and most expensive.

Describing a multimedia classroom in terms of levels can assist school districts to design a *technology plan*. Level One can be part of phase one of a district's technology plan. Level Two is implemented after phase one; and so on till Level Four is a reality.

On the other hand, a district could reach out to its students' parents and business community for a partnership to implement Level Four (TEC) immediately. Also, there are numerous state, federal, and private-foundation grant programs that may potentially be used to fund the creation of a TEC, including grants targeted for drug education, special-education and at-risk students.

The important thing is for a district to begin *now*. Every district, no matter how rich or poor, big or small, can use the tools and strategies just described to train teachers and revolutionize classroom learning. You can begin with big bucks and big ambitions; or you can begin small, simple and be experimental. Either way, as hundreds of Michigan teachers have learned, it is now possible to make classroom learning more exciting than MTV. ■

If you are interested in the Teacher Explorer Center and would like to visit us or receive more information about our program, please contact:

Sharon Goth-Tew, Administrative Director  
Teacher Explorer Center  
East Lansing Public Schools  
509 Burcham Drive  
East Lansing, MI 48823  
Voice: (517) 337-1781, Ext. 58  
Fax: (517) 337-8171



FRED D'IGNAZIO

Fred D'Ignazio is director of the Teacher Explorer Center. He is the author of over 20 books, a national TV and radio commentator on education and technology, and an internationally known expert on multimedia classrooms and cooperative learning. He has presented multimedia workshops in over 60 school districts around North America and has held faculty positions at institutes in Brazil, Portugal, England, Canada and the U.S.

## A Typical Day at the Teacher Explorer Center

Teri, a teacher, arrives at East Lansing High School for her free workshop. As she enters the Teacher Explorer Center she sees "tiny tech" everywhere: computers, video cameras, CD players, VCRs, TVs, videodisc players, CD-ROM jukeboxes, miniature speakers, microphones and more. At the front of the room is a giant TV monitor; TV and computer screens surround her. Dancing across the screens are electronic slide shows; animations; CNN's live, global news broadcast; and images of Martin Luther King, Jr., Hurricane Hugo and Mother Teresa. Coming from two, tiny speakers are the sounds of booming surf.

### Immediate Immersion

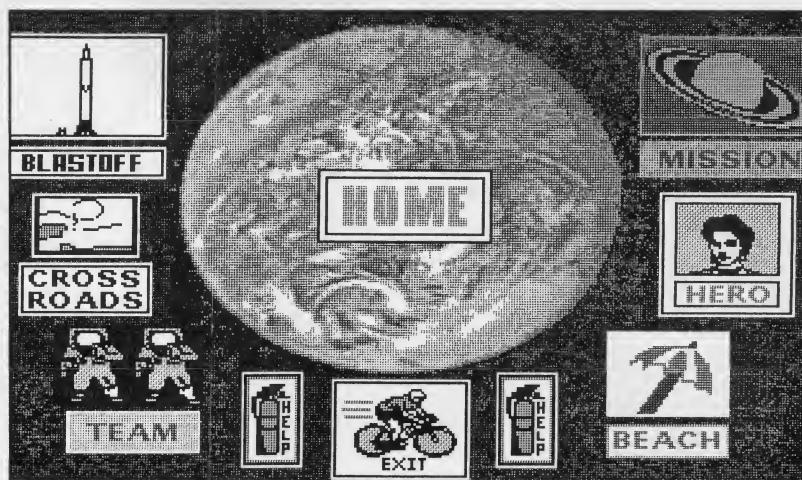
A small, bearded man walks up and greets her. It is Fred D'Ignazio, instructor and the TEC's director. He barks out an itinerary, even before Teri has fully entered the room: "Sign the workshop roster," he says. "Put on a name tag. Pick up your folder. Select a team workstation. Sit down with your team and begin your first project."

The room has five tables, arranged in a circle. Each table has its own video camera, computer, VCR, videodisc, CD player and TV. "These are your team research and publishing centers," D'Ignazio says. "You'll be publishing a videotape journal of your experiences today as teacher/explorers. You can take the tape home, pop it into any VCR, and share your experiences with your school and district."

Teri gets together with the other members of her team and they find a workstation. "This is a workstation of tomorrow built from the equipment of today," D'Ignazio explains. "By the mid-1990s, everything on this table will shrink down and *fuse* into a single multimedia computer that can fit on your lap. It will handle full-motion video; hi-fidelity, digital sound; telephone and fax communications; and have billions of words of storage. And," he predicts, "it will cost less than a \$1,000."

### Lights, Camera, Action!

To demonstrate what TEC workstations can do, D'Ignazio dims the lights.



THE BEGINNING OF EACH TEAM'S EXPLORATIONS

The voice of President Kennedy fills the room and his TV image appears on two huge screens. It is the early 1960s and Kennedy is launching a mission to the moon. Kennedy disappears. It is 1969 and the scene is Cape Canaveral. The perspective is that of being only inches away from the rocket that launched the Apollo astronauts on their historic lunar journey as it is taking off. The floor vibrates; a roaring fills the air; gashes of flame and smoke flood the screens.

D'Ignazio turns the lights back on. "Kids ask, 'Why study science?'" he says to the participants, "With a teacher station like this one, any teacher can take students on a field trip to the moon. Then young people will know why science is important—and more exciting than a monster roller coaster!"

Over the next six hours Teri and her team members explore this new world of multimedia and multi-sensory learning. They create an electronic field trip to The Louvre, journey inside an exploding volcano, witness a chemical reaction at the molecular level and take an aerial tour of French chateaus along the Loire River. The team does this by freezing videodisc-based images and capturing them as computer files for later use. Sounds can also be captured from videodiscs then played back by on-screen buttons designed with software.

Teri and her team also explore titles stored on the CD-ROM "jukebox" networked to each team's workstation. They dive into electronic encyclopedias

and various CD-ROMs with content ranging from x-rays of bones moving under a person's skin to digital "movies" of cheetahs and giraffes galloping across the African plains.

Along the way, Teri's team creates a videotape "journal" of their day at the Teacher Explorer Center. The tape features animated computer graphics, digital sound effects and music from CDs, plus narration by team members on the day's experiences as they happen.

### Day's End

At the end of the day D'Ignazio leads a lively discussion on how teachers can get started back in their own classrooms using a minimum of equipment.

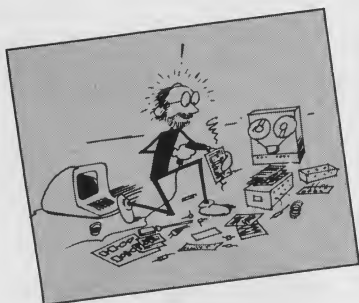
"But that doesn't let you administrators off the hook," he says, talking to the principals, superintendents and school board members in the group. "Every school district can afford the \$8,000 it took to set up a TEC like this one. Business is very eager to help public schools improve their programs, and assisting in the setting up a state-of-the-art training center is a good start. It's up to you to persuade them of this."

"They even get an immediate pay-off," D'Ignazio continues, "because as soon as the center is set up in a local high school, trained teachers and students can begin offering evening courses to local-business employees. And the spin-off effect is invaluable to both sides." ■

# THE WORLD INSIDE THE COMPUTER

## Winnie The Pooh's Alphabet Adventures

Fred D'Ignazio, Associate Editor



One afternoon while Eric was riding his Big Wheel bike on the sidewalk in front of his house, a brown UPS truck pulled up, and a man hopped out and put some giant boxes on Eric's front porch. Eric went

and got his dad. His dad told him that inside the boxes was a new NEC Trek home computer that had been sent, on loan, from the NEC Home Electronics Company in Elk Grove Village, Illinois.

They set the computer up in Eric's bedroom. He liked the computer. It was neat to look at, with its ivory case, and its gray and orange keys. It was easy to use, too. He used its Micro Painter program to make pictures and its Electric Pencil program to do lots of gobbledygook processing.

The NEC Trek was special, too, because it had games with all of Eric's favorite Walt Disney characters. He wanted to play the games and see Mickey Mouse, Donald Duck, Cinderella, the 101 Dalmations, and Winnie the Pooh. But, so far, he still hadn't played any of the games.

His dad had lots of excuses to explain why

the games weren't ready. He mumbled something about RAMs and ROMs and an extended BASIC cartridge that hadn't arrived.

Eric already had a game disk with the word WINNIE written in big letters in blue ink. The disk had a game called Winnie the Pooh's Alphabet Adventures. But his dad told him that they still didn't have a disk drive to put the disk into.

He really wanted to see the Winnie the Pooh program, so he put pressure on his dad to get his act together and find the equipment they needed to make the program work.

Pretty soon, more big brown boxes started arriving in the mail. Eric loved opening boxes. He had never run into a box he couldn't open. When he was only six months old, his parents put a box around him, with holes for his head, legs, and arms. On the side of the box his dad drew, in big letters, the words PAPER SHREDDER. And he drew lots of pretend dials and switches. It was Eric's first Halloween costume. He went to three

*Fred D'Ignazio is a computer enthusiast and author of several books on computers for young people. His books include Katie and the Computer (Creative Computing), Chip Mitchell: The Case of the Stolen Computer Brains (Dutton/Lodestar), The Star Wars Question and Answer Book About Computers (Random House), and How To Get Intimate With Your Computer (A 10-Step Plan To Conquer Computer Anxiety) (McGraw-Hill).*

*As the father of two young children, Fred has become concerned with introducing the computer to children as a wonderful tool rather than as a forbidding electronic device. His column appears monthly in COMPUTE!.*



*The first frame of Winnie the Pooh's Alphabet Adventures game is on the display screen. Next to the NEC Trek computer are several other games produced by the Walt Disney Educational Media Company.*

Halloween parties, crawled around on the floor, and shredded any paper that he found in his path.

But Eric wasn't a baby any longer. He was four years old, and he could shred boxes the way he used to shred paper. When the computer boxes arrived, he opened all of them with his bare hands. Inside the boxes were the computer parts his dad had told him about. He helped his dad attach all the parts to the main computer that was sitting on a little table in Eric's bedroom.

### Run, Winnie, Run!

Finally a box came with the last part. Eric huffed and puffed and "Hulked" open the box. Then he and his dad raced to his bedroom to put the missing part into the computer.

His dad turned on the power. The computer worked! Eric hopped around the room. He almost fell on the computer, he was so excited.

His dad let him put the Winnie the Pooh disk into the disk drive. He let Eric do everything on the computer all by himself. While he was working on the computer, sometimes he saw his dad put his hands over his eyes. Sometimes he saw him grit his teeth and look like he was going to cry. Sometimes he even heard him growl. But he always let Eric do everything. Because of this, Eric was getting pretty good at computers, even though he was only four years old.

His dad read from the NEC manual for the *Alphabet Soup* package. Eventually there would be two programs in the package: the Winnie the Pooh alphabet game and another game called Mickey's Lucky Stars. Mickey's Lucky Stars would teach Eric how to match small letters in the alphabet with big letters; and help him learn which letters come before other letters and which ones come after.

Eric's dad read the commands from the manual. He repeated the letters, one by one, and Eric typed them into the computer. When he was done, the command RUN "winnie." was on the screen. He pressed the RETURN button to send the command to the computer.

Out of the computer's speaker came the song "Winnie the Pooh," and the Pooh bear himself appeared on the screen. Beside him was a big, yellow, blinking question mark.

Just then the telephone rang, and Eric's dad took off. "I'll be right back!" he called.

"Sure," Eric thought. "In about a million years."

Eric didn't feel like waiting a million years. Besides, he knew what to do next, even without a manual. When he saw a question mark on the



screen, that meant the computer wanted him to type something in. "But what should I type?" he wondered. He picked his favorite word: ERIC.

He typed an E, then began searching for the R. But before he got there, the disk drive light came on, the drive began clacking like his Big Wheel bike, and Winnie the Pooh vanished from the screen.

A moment later, a new screen appeared. It was divided into several rectangles, each a different color. The Winnie the Pooh character, Tigger, appeared in the upper left-hand corner of the screen. In the upper center portion of the screen, two E's appeared — one uppercase and one lowercase. On the right-hand side of the screen was an elephant. In the lower left-hand corner of the screen was a yellow box. The box was empty.

All these things appeared on the screen, but Eric didn't notice. He was still busy typing his name. He typed an I and a C, then he looked up.

His dad sailed back into the room. He looked at the screen. "Hey, that's great, Eric," he said. "How'd you do it?"

"By typing my name," Eric answered, not sure whether to be proud or puzzled. "It made an E, but it didn't make an R. Or an I. Or a C."

## I Know What To Do!

"I wonder what we do, now," his dad said, peering closely at the screen. The NEC company had sent Eric and his dad about ten pounds of computer manuals to assist them on the computer. But the two of them rarely used manuals, especially when they were just getting started. The fun part of running new programs was to see if they could make them work without reading the instructions.

Eric's dad was naturally cautious around computers. He tried to figure out which button might make the program do something.

Eric had a better approach. When he didn't know what to do next, he pressed *all* the buttons.

His strategy worked. After only a few seconds and a couple of dozen buttons, he found one that did something. He pressed the DEL (Delete) key, and the empty yellow rectangle in the lower left-hand corner of the screen turned blue. He pressed the button again and it turned red. Then it turned green. Each time he pressed the button, it turned a new color.

When Eric pressed the E key, the computer played a little more of the Winnie the Pooh song then went back to the picture of Pooh and the big question mark.

"Hey!" Eric said. "E makes a picture. Then E makes the picture go away."

He pressed some more keys. He eventually made it up to the orange function keys on the top of the keyboard. When he pushed the F4 key,



*This screen appears after the boy has typed the letter "J." The Winnie the Pooh character is Kanga. When the boy draws on the touch panel (in the lower corner, on the far right), his picture will appear in the box in the lower left-hand corner of the screen.*

Winnie the Pooh, Tigger, and Rabbit appeared on the screen and, with musical accompaniment, waved goodbye.

"Oh, terrific!" said Eric's dad, more than a little distracted and disturbed by Eric's shotgun approach to using the computer. "Now you've terminated the program, and we've only gotten to see one letter."

Eric was momentarily stymied. But at the moment he felt like he could do anything — the way he felt when he was rustling up a jellybean, Cheerio, and dry-noodle stew in the kitchen, or tying his shoes, or stirring up Mowie's breakfast of gooey cat food and kibbles. He surveyed the keyboard. Then he was ready. "I know what to do," he said confidently, and began pressing all the keys at the same time.

He got to the F5 key and pressed it. Winnie and his friends disappeared. The title frame came back on. He had restarted the game. He looked up at his dad. "See?" he said.

## All It Takes Is Teamwork

Eric and his dad worked well as a team. With their combined brainpower and Eric's penchant for button pushing, they soon figured out how to use the rest of the program.

For example, when Eric pressed the F1 button, the NEC thermal printer started making noises like a tire spinning on ice, and paper started creeping out with a copy of the picture on the computer display screen.

Eric loved this part. Printing pictures was so easy! Very quickly, his bedroom floor filled up with 4-inch by 4-inch scraps of paper featuring all the Pooh characters and creatures whose names began with every letter from A to Z.

## Solving The Mystery Of The Blank Box

The blank box in the lower left-hand portion of the screen was the greatest challenge. Even when Eric printed out the display screen, the box was empty. Why was it empty? Either the program was broken and the box was supposed to have something in it, or Eric and his dad were supposed to put something in the box themselves.

They tried using the joystick. That didn't work.

They pressed all the keys on the keyboard again. No luck there, either.

They were about ready to give up and peek at the Winnie the Pooh program's instructions. Then they figured it out. They could fill up the box by drawing things on the NEC Trek touch panel, a flat drawing tablet that reproduced a copy of a picture on the computer's display screen.

The touch panel freed Eric from the computer keyboard. And that's when the real fun started!

His dad went into his study and cut up lots of pieces of paper to fit on the touch panel. Two flexible magnetic strips held each piece of paper on the panel so it wouldn't move about.

Eric climbed on the metal truck and, on top of his dresser, found the black felt-tip marker that NEC had supplied with the touch panel.

He began drawing on the panel. He drew circles, triangles, straight lines, and random squiggles. Then, satisfied with his artwork, he pressed the F1 button and printed his picture — complete with a letter of the alphabet (in upper- and lowercase), a picture of an animal whose name began with that letter, and a character from Winnie the Pooh.

Eric then took the pictures he had just drawn and put them onto the touch panel. He created new pictures by tracing the animals and letters on the old pictures. He created drawings that looked reasonably like Winnie the Pooh, skeleton hands, elephants, alligators, and birthday cakes.

For Eric this was a thrill — such a thrill that he drew pictures on the touch pad, picture screen, and thermal paper for another two hours. And the next morning, when he woke up, it was the first thing he wanted to do, even before his all-important bowl of Cheerios.

## Drowned In Alphabet Pictures

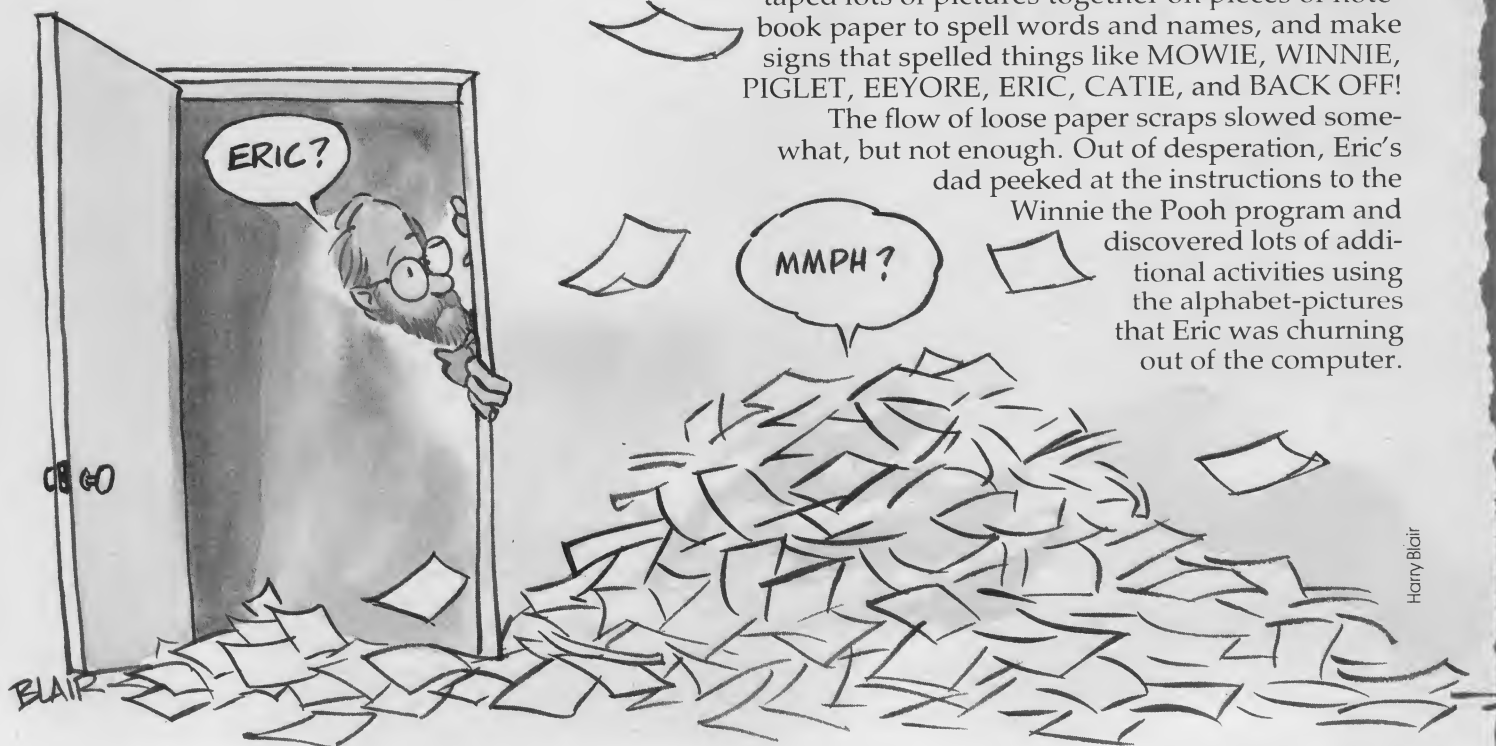
The night before, after the first hour, little scraps of paper were all over Eric's bedroom. Eric wanted to create a picture for each of his pets (his robot Denby, his puppy, and his kitty), for each member of his family and all his friends. Each picture had the first letter in the name of the person or creature it was going to.

Paper scraps flooded the bedroom, and his dad grew alarmed. He had visions of being drowned by Pooh pictures. He suggested that Eric try to group the papers into piles.

To his dad's relief, Eric came up with the idea to make "books" out of several of the pictures. The letters could be grouped together to make alphabet books, or to form the complete names of his mother, father, sister, grandparents, cousins, and his pets, creatures, and friends.

He and his dad got busy and turned Eric's bedroom into a miniature printing company. They stapled the pictures together into books, and they taped lots of pictures together on pieces of notebook paper to spell words and names, and make signs that spelled things like MOWIE, WINNIE, PIGLET, EYORE, ERIC, CATIE, and BACK OFF!

The flow of loose paper scraps slowed somewhat, but not enough. Out of desperation, Eric's dad peeked at the instructions to the Winnie the Pooh program and discovered lots of additional activities using the alphabet-pictures that Eric was churning out of the computer.



# Buying A Ticket To The Magic Kingdom

Walt Disney software runs on the NEC Trek computer (also known as the PC-6001A). Here are the prices of the components of a minimal NEC Trek system that will take full advantage of the software's features:

NEC Trek Computer (PC-6001A)	\$349.95
Disk Unit (PC-6031A)	549.95
Data Recorder (PC-6082A)	99.95
Expansion Unit (PC-6011A)	99.95
Extended BASIC Cartridge	49.95
32K ROM/32K RAM Cartridge	49.95
Touch Panel (PC-6051)	149.95
Thermal Printer (PC-6021A)	249.95

Of course, you will also need a monitor or TV set to run the Walt Disney software.

The NEC Trek is an excellent home computer system. It is attractive, its full-sized keyboard has a nice touch, and the display on computer screen is beautiful: Large white characters are displayed on a rich green background, and helpful function keys are displayed, as a reminder, at the bottom of the screen. The system's components are equally attractive and are reliable, easy to attach, and easy to use.

But do you need all the components above to run the Walt Disney software?

You need most of the components, but not all. The Walt Disney software will be sold on cassette and disk, so you need to buy a data recorder (\$99.95) or a disk unit (\$549.95), but not both. The data recorder is the way to go if you have a tight budget, but I don't recommend it. The Disney software takes up a lot of space in the computer's memory. Loading the programs from cassette will be tedious and time-consuming — not the way to get started on a fun learning activity with your child.

In addition, you do not need the touch panel (\$149.95) or the thermal printer (\$249.95) to make the software run. However, if you elect to go this low-budget route, I think that you'd be better off (in the case of "Winnie the Pooh's Alphabet Adventures") with an inexpensive alphabet book for your child. The touch panel and the thermal printer are the keys to making the software

interactive and a joyous experience for a young child (see my accompanying review with my four-year-old son Eric). Young children can use the touch panel and the thermal printer and create *their own* alphabet books.

Winnie the Pooh's Alphabet Adventures will be part of a two-program package entitled *Alphabet Soup*. The other program will be Mickey's Lucky Stars and will teach letter sequences. *Alphabet Soup* is already available. It is just the first of five Walt Disney software packages. The packages teach the letters in the alphabet, reading, writing, spelling, and arithmetic. They will also help develop a child's problem-solving, logic, and fine motor abilities. Each package will cost \$34.95 (disk or cassette).

I will review the forthcoming Disney packages in future issues of COMPUTE!. The reviews will appear about the time that each package is released. Here are the titles of all the packages and programs:

*Alphabet Soup* (Ages 3 – 7)

Winnie the Pooh's Alphabet Adventures

Mickey's Lucky Stars

*Goblins & Galaxies* (Ages 9 – 14)

Minnie and the Haunted Mansion

Goofy in Space

*Mathematical Maze Craze* (Ages 7 – 12)

Cinderella's 3-D Maze

Mickey's Mathematical Mops

*Race To The Arcade* (Ages 7 – 14)

Donald's Word Arcade

Dalmation Multiplication

*Countdown Carnival* (Ages 7 – 10)

Mickey and the Beanstalk

Cinderella's Beads

If you want to learn more about the NEC Trek (PC-6001A) computer and the Walt Disney software, write or call:

The Personal Computer Division  
NEC Home Electronics USA  
1401 Estes Avenue  
Oak Grove Village, IL 60007  
312/228-5900

They began to use the pictures as alphabet flash cards and played lots of games, including Concentration (guess the missing letter), Scrambled Letters (trying to reorganize letters to make up a word), Letter Match (matching up lowercase and uppercase letters), Tasty Letters (matching up flash cards with alphabet cereal letters), Alphabet Clothes Line (taping the letter pictures to a string hanging in the room), Mystery Letters (letting Eric run his fingers along the clothes line, and trying to guess which letter he is pointing to).

The Winnie the Pooh user's guide even had a short BASIC program to type in to create a new game. Eric and his dad typed in the game. It was a Mystery Letter game. It typed a sequence of letters on the computer's display screen, but one letter was missing. Eric had to guess the missing letter. If he got the letter right, his dad let him print the letter out on the computer printer.

### Typing With His Toes

The more Eric used the Winnie the Pooh program, the more relaxed and creative he became. In the beginning, he sat stiffly in front of the computer keyboard and picture screen, held the touch panel in his lap, and drew on sheets of paper. But by the end of his first session things had changed drastically. His dad lay on his side, sprawling behind Eric, watching him draw his pictures. Eric decided he wanted to get more comfortable, too, so he climbed up on his dad, using him as a reclining lawn chair. He stopped using the paper and marker to make pictures and, instead, began drawing pictures with his finger on the white, glossy plastic surface of the touch panel. It was like electronic finger painting, and he loved it!

When Eric climbed on his dad the first time, he accidentally kicked the Expansion Panel on the side of the computer. Loaded in the Expansion Panel were a RAM cartridge and the Extended BASIC cartridge needed to run the program. When the Expansion Panel became dislodged, the screen went blank and the program disappeared.

Eric pushed the Expansion Panel back against the computer, but he didn't want to reboot the disk (he'd already done that before), so his dad had to do it. While the program was reloading, Eric did backward somersaults across the bedroom floor.

His dad lay back down. Eric stopped doing his somersaults and climbed onto his dad again. As he was making himself comfortable, he pulled the cord out of the touch panel. His dad saw the cord fall off, but he didn't say anything. Eric spent about a minute making a drawing with his finger before he looked up at the computer's picture screen. The little picture box was still empty.

Eric pushed all sorts of buttons on the computer before he realized that nothing was hap-

pening because the touch panel was no longer connected to the computer. This prompted his dad to deliver a little lesson on computer cables as "highways" for the computer's information to zoom back and forth from the computer to peripherals like the touch panel and the printer.

Eric and his dad also discussed the pins on the ends of the cables, so that Eric would know the proper way to plug the cables into the computer and the other equipment.

Eric got the touch panel hooked up. He climbed back up on his dad, dug his elbow into his dad's rib cage, and began drawing. But now the touch panel was upside down. This appealed to him. Everything he did on the touch panel showed up backwards and upside down on the picture screen.

He tried typing the letters in his name. He tried making numbers. He made faces, houses, and robots. Everything appeared on the screen backwards and upside down.

Eric turned the touch panel on its right side and drew pictures. Then he turned the panel on the left side. Then he turned the touch panel over and tried to draw pictures on its bottom. When he found that this didn't work, he improvised by drawing a picture with his knee.

When he was done drawing, he said, "Daddy, please press the print button."

"Phooey!" his dad said. "You're lying on me. How am I supposed to press the button?"

"Please, Daddy?"

When his dad heard that "Please, Daddy?" he couldn't resist. "I'll see what I can do," he said. He looked down at the computer. His bare, sockless foot was only a couple of inches to the left of the keyboard. He lifted his leg carefully (so as not to dislodge Eric and his touch panel) and stretched his big toe toward the F1 button on the keyboard. He missed. The computer made haunted house music to show that he had pressed the wrong key.

He tried again. This time his toe hit the right button. The printer started chugging away and printed Eric's picture.

"Wow!" Eric said, impressed by his dad's display of pedal dexterity. Unfortunately, this gave Eric ideas. It opened his eyes to new ways to interact with computers. He knew that using his fingers was OK, and his sister had once operated her computer using her tongue. But he had never considered using his toes. Until now.

The rest of the evening Eric practiced pressing all the buttons on the NEC Trek with his toes.

He did pretty well, too. And his dad let him do it. But his dad created one rule that Eric had to obey. Before he could continue using the computer, he had to submit to a thorough sponge bath of both feet.

## The Electronic Chalkboards: The BBC And The Powerpad

### The Only Computer To Have When You're Having More Than One

Last spring I went to London and taught a course on robotics literacy. According to the *Daily Telegraph*, the classroom where we met was like a "composite of several scenes out of *Dr. Who*." We had robot turtles and robot buggies rolling around on the floor, and robot arms waving and weaving on the tops of our desks. And we had 15 BBC microcomputers linked together in the BBC's Econet local area network. The students used the BBCs to control the robot arms, to learn Logo and BASIC, and to perform experiments with robot sensors.

The 15 BBCs all received their programs from a single disk drive (the *fileserver*) in the front of the classroom. They all used a single printer (the *printserver*) to type out files, programs, and student papers and assignments.

David Barnett, the course's computer instructor, used a BBC as the demonstration computer. David's BBC was connected to a large television set mounted on a shelf so all the students could see it. The computer acted like the course's *electronic chalkboard*. David ran programs on his computer, and they appeared on the big TV. Then he pressed a button, and a copy of his computer's screen appeared on the screens of all the students' computers.

The system was even more flexible than this. The students all worked on individual and team projects. When they finished their projects, they made presentations. To aid their presentations the students could send copies of their screens to all the other students' screens.

And David, in front of the class, could help individual students if they got bogged down in a program. By pressing a couple of buttons on his computer, he could take a snapshot of the screen

on a student's computer. After studying the student's problem, he could take control of the student's keyboard and type in a command or piece of information. The student could watch all this on his or her own screen. A moment later, David would return control to the student, and the student could resume running the program on his own.

This was a tremendous feature. When I am teaching a course and a student asks me a question, I often have to sit down at the student's computer in order to decide what is going on and what to suggest. If you have 15 students, and they are all asking questions, it can get pretty hectic running from computer to computer.

The BBC network eliminates this problem. You can stay seated at your own computer and, with the push of a button, you can "hop" to any student's computer, diagnose his or her problem, and enter the appropriate response. This feature alone, in my opinion, makes the BBC network extremely valuable.

### The Only Computer That Majors In Education

Acorn Computers Ltd. sells the BBC computer in England. Its subsidiary, Acorn Computers Corporation, is now selling the BBC in the United States. Acorn can be reached at:

Acorn Computers Corporation  
400 Unicorn Park Drive  
Woburn, MA 01801  
(617) 935-1190

The company is concentrating its efforts exclusively on the \$700 million US education market. Two years ago, the Acorn computer won a contest sponsored by the British Broadcasting Corporation and was given permission to name its computer the BBC. Acorn has since sold BBC computers to 85 percent of British primary and secondary



Five-year-old Jessica Harvey is playing a BBC learning game called Missing Signs.

schools. This amounts to 150,000 computers already installed and 30,000 new computers going out each month.

The US version of the computer is equivalent to the more powerful BBC/B version. For the hefty \$995 price tag, you do *not* get a monitor, a printer, or a disk drive. But you do get 64K RAM/ROM, an additional 80K ROM, built-in BASIC, a (TI) voice synthesizer, built-in word processing, high-resolution graphics (640 x 200 pixels), multi-channel sound, and a software switchable 40- or 80-character screen.

The computer comes with either an RS-423 or Centronics parallel port and with the Econet network interface built-in. The actual network, including software, costs \$595, and enables you to connect up to 254 computers on an inexpensive, four-wire, telephonelike cable. The 6502 processor can be augmented to include an additional 6502 processor, or a Z80, or 32-bit National Semiconductor 16032 processor.

A 440K disk drive costs an additional \$545; an 800K disk drive costs \$995. Acorn offers a monochrome monitor for \$195. The computer will support any of the popular printers, over the serial or parallel ports.

I know from having used the computer in England that the operating system and the computer's version of BASIC are a programmer's delight — extremely powerful yet simple to use. But Acorn's marketing strategy in the US will focus on the software that has been developed for the machine. Two hundred fifty educational packages have already been created for the BBC and approved by Acorn's prestigious nine-member Educational Advisory Board.

In addition, 2,500 software companies produce software for the BBC in England and in Western Europe. Many of these companies are modifying and enhancing their packages so they will meet the board's approval and be available on the US version of the machine.

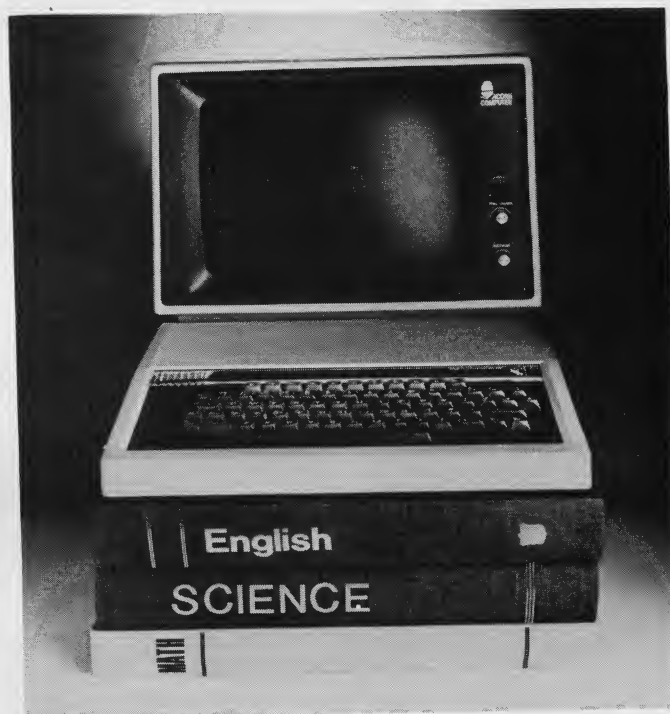
## We Give Courses On How To Give Courses

According to Harvey Lawner, general manager and senior vice president of Acorn (US), "Education is our main business. It is not an afterthought." Lawner is critical of computer companies that concentrate on getting a computer into a classroom, but do not provide direct and immediate support. "We aren't just selling a computer," Lawner contends. "We are selling a total learning system."

Lawner's national marketing director, Bob Angelo, contrasts his company's approach with the hardware-first approach adopted by other American companies. "They're selling boxes," he says. "We're selling solutions."

For an educational software package to be approved by the Educational Board, it must be supported by a lesson plan, a student's workbook, a teacher's guide, student notes, and (when appropriate) student experiments. This *print component* forms an integral part of Acorn's effort to turn the computer into a tool that any teacher can use no matter how little experience he or she has had with a computer.

Acorn's philosophy is to package the BBC in a way to make it as familiar as possible to the average teacher. The software, for example, comes in boxes that look like quality, hardcover, linen textbooks.



Acorn Computers Corporation is trying to make the BBC computer look familiar and nonthreatening to teachers. Even the software is packaged to look like classroom textbooks. (Please note: The "books" in this photo are oversized.)

According to Angelo, Acorn isolated two problems which have inhibited the introduction of microcomputers in the classroom. First, most of the software currently appearing in the classroom is often three to four years old, or even much older. The old software does not reflect the newest philosophies in educational computing and does not make use of the advanced hardware capabilities of the newer microcomputers.

Second, computers in school are being used only by a relatively small number of teachers and students. Most teachers are fearful of the computers and don't see how a computer can make a valuable contribution to their own teaching.

Angelo says that Acorn will attack both these problems head on. First, Acorn is commissioning the development of a huge quantity of new software for use in classrooms on the BBC computer. Second, the Acorn board is helping software companies to translate to the BBC the best new software currently running on other machines.

### Chalk Board's PowerPad

Last week I flew to New York and got a chance to preview one of the most exciting new products on the market — the PowerPad, a touch-sensitive tablet in a 20-inch-by-17-inch hard plastic case. The PowerPad plugs into VIC-20, Commodore 64, IBM PC, Apple, and Atari computers.

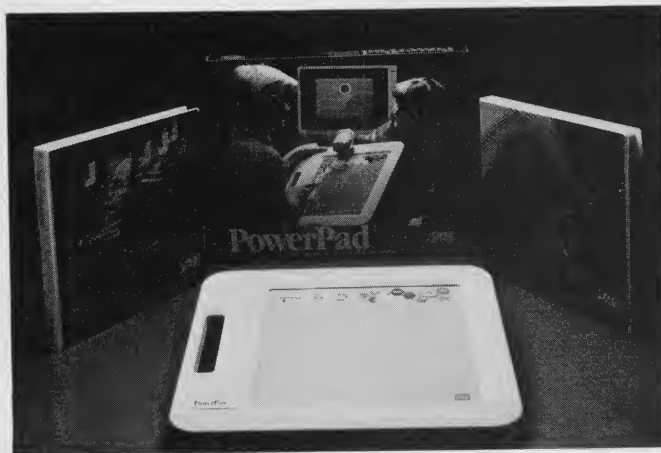
The PowerPad can replace the keyboard as the primary means of inputting information into the computer, especially for children. It has numerous mylar overlays which easily clip on top of the 12-inch-by-12-inch touch-sensitive pad. Each overlay is a new keyboard, a keyboard with colorful shapes and figures.

The PowerPad has only a few "keys" on each overlay, so the child or the beginning user isn't overwhelmed by choices.

The "keys" are large and in bright primary colors. Printed on them are bold words (RED or PLAY) and symbols such as # or \*. They are separated by plenty of space to make typing simple.

The PowerPad features a novel design in which signals from the tablet are digitally sensed and encoded. A grid of 14,400 contact points (100 points per square inch) is sandwiched inside the PowerPad. The points can record one contact at a time or a dozen contacts. Older touch pads can sense only one finger at a time. But kids (and adults) can put *all* their fingers on the PowerPad at the same time, and the PowerPad will sense all of them and transmit the proper signals to the computer.

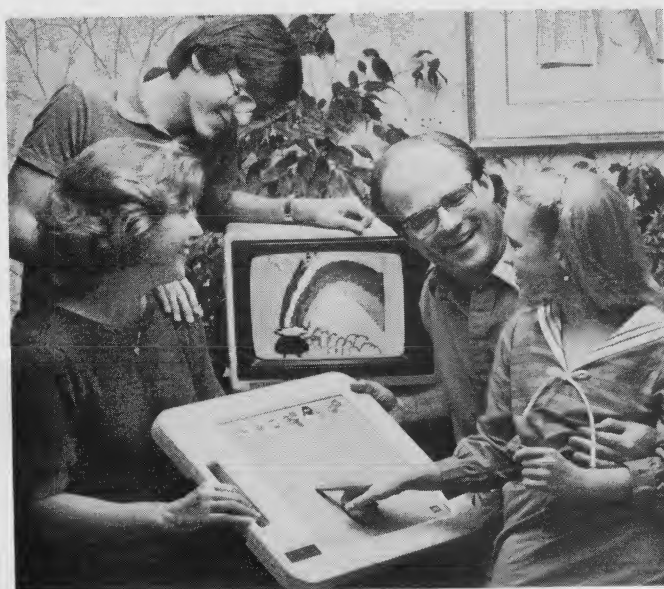
This capability is especially nice with the PowerPad's music software and overlay, *Micro Maestro*. The overlay has a piano keyboard at the bottom and a musical score in the middle, with colorful "buttons" for each note on the score. A



PowerPad with its 12 × 12 inch touch-sensitive surface, and two selections from Leonardo's Library, *MicroMaestro* and Leo's 'Lectric Paintbrush.

child can play a musical chord on the piano keyboard by pressing all three fingers on different keys at the same time. This would be impossible on any other touch pad.

Another software-and-overlay package, *Leo's 'Lectric Paintbrush*, helps a child create colorful pictures on the computer. Again the multicontact feature of the PowerPad becomes especially useful. Before drawing each new part of the picture, the child can press the Pen Up button on the upper left-hand corner of the PowerPad. Immediately a pen tip appears. The child can change the color of the ink being used by pressing one of the colorful paint keys on the upper right-hand corner of the



This family is using the PowerPad with the overlay for Leo's 'Lectric Paintbrush, which allows you to "paint" colorful pictures on the computer screen with your finger. Using the "buttons" at the top, you can create shapes, move them around on the screen, create copies, and then save an entire screen onto tape or disk.



Robert H. Ranson, President of Chalk Board, showing the PowerPad fitted with the MicroMaestro overlay.

board. When the child picks a new color, the color of the pen tip changes to that color.

## Leonardo's Library

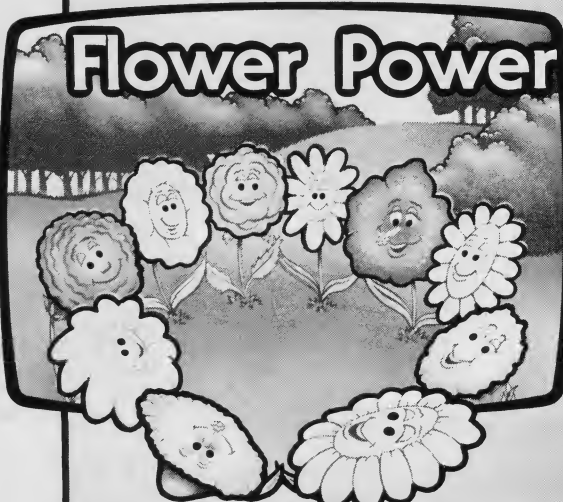
The PowerPad costs \$99.95. It is supported by a large and growing body of educational software, called Leonardo's Library. Programs in the library will cost between \$25 and \$50. The library will include programs focusing on visual arts, music, math, science, language arts, and social studies. Included among the first programs are:

- *Leo's 'Lectric Paintbrush*. An electronic finger-painting kit.
- *Micro Maestro*. Turns the PowerPad into a piano keyboard.
- *Music Math*. Lets children explore the relationships between math and music.
- *Programmer's Kit*. Lets older children and adults write their own software and develop their own creative uses for the PowerPad.

PowerPads and programs in Leonardo's Library are already available at K mart, Apple Computer dealers, and many other computer and discount stores. If you would like to know more about the PowerPad, you can contact Chalk Board directly:

Chalk Board, Inc.  
3772 Pleasantdale Road  
Atlanta, GA 30340  
(404) 496-0101

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# MUD Pie School

## AUTHENTIC PUBLISHING ON THE INTERNET

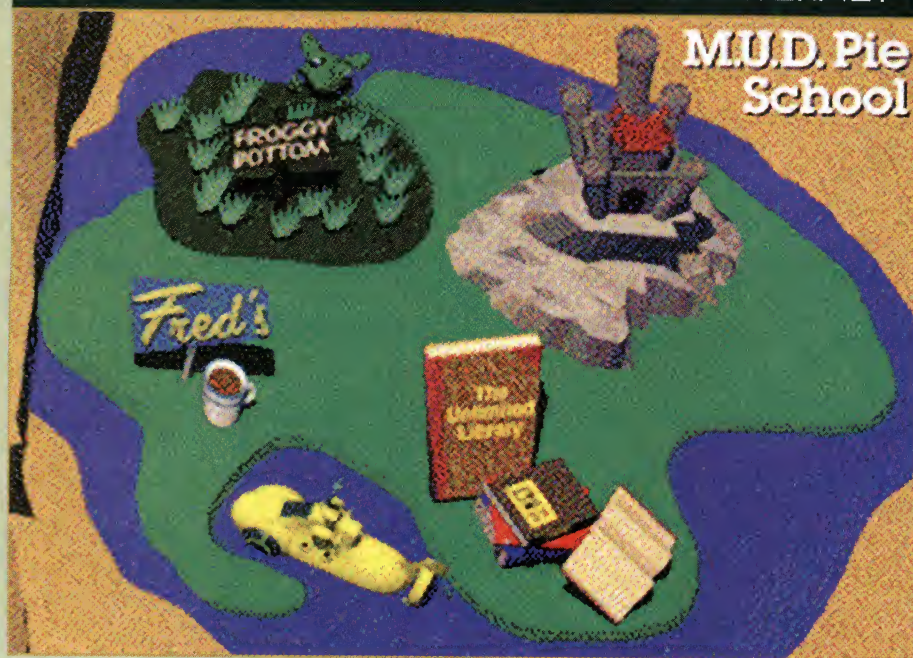


Figure 1. Map of MUD Pie Island, Fred D'Ignazio's educational Internet Web site.

Because the Internet makes the audience and the medium freely accessible to students, their authentic publishing projects can be easier, more frequent, and more effective.



By Fred D'Ignazio

I believe in authoring as a powerful method for learning—in all subjects, in all grades, and continuing throughout a person's life. As you know, I have been an author, sharing what I have learned with students and teachers in at least 25 books in addition to my column in *L&L*. I have advocated students doing authentic publishing, which includes conducting real-world research, identifying a bona fide audience, and focusing on subjects that have meaning to the students and contribute to everyone's knowledge of the world. If you have been reading my columns over the years, you know that I believe the Internet presents a remarkable opportunity for students to do authentic publishing.

Figure 2. Dr. Frederick Dejeuner (at left) is the "principal" of MUD Pie School.

### Authentic Publishing on the Internet

In the near future, the Internet will be more accessible and less expensive, and it will play a growing part in student's daily authoring and researching tasks. Through the power of telecommunications, students will be able to journey out of the classroom regularly to do online research around the world, interview content experts in real time, and collaborate with other student authors in remote classrooms. These resources will be part of your life and your students' lives before you know it.

### Welcome to MUD Pie School

To prepare yourselves to be authors in these new educational "worlds," I have constructed a beginner's world I call MUD (Multimedia U Design) Pie Island. It is a make-believe island, created purely out of my imagination, but it has a serious purpose. On MUD Pie Island I have built an authors' school, a map of which is shown in Figure 1, that helps newcomers get started.

### Meet Our Zany Faculty

Life at MUD Pie School couldn't be simpler. Today there are only five classrooms on MUD Pie Island, designed around the five-part strategy that I have written about in my *L&L* columns over the years: real-world research, multimedia authoring, research on the Internet, conducting online interviews, and publishing Internet Web pages. You and your students can attend this school at: <http://www.mudpie.org>.

These classrooms are run by a band of quirky teachers who are led by their good-natured principal, Dr. Frederick Dejeuner (Figure 2). The rest of our faculty is pictured in the "MUD Pie Faculty"

section on page 60, demonstrating the fun things you can do when you do authentic publishing using multimedia and the Internet with your students.

For classrooms that aren't on the Internet yet, I have also created a CD-ROM that contains copies of Netscape Navigator Gold and Claris Home Page, and step-by-step instructions on how to get online. The neat thing about MUD Pie School is you can create and publish Internet Web-style pages *even if you aren't on the Internet!*

### Unlimited Library

At MUD Pie School I want to create a rich demonstration of students' authentic publishing projects. I have tremendous faith in students' abilities to do meaningful research, thinking, and imagining, and I want to provide a gallery to share every students' work with the world.

I invite you and your students to attend the free online version of MUD Pie School, create your own Web pages, and send them to me so that I can add them to the growing gallery of student work on the Internet. I hope that one day soon we will have hundreds or even thousands of home pages online as an impressive exhibition of knowledge created by kids for kids. Eventually, I hope to see these Web pages become online classrooms created and maintained by real-world students and real-world classrooms as an educational resource for students around the globe.

### Multimedia on A Shoestring

You may be thinking that projects like these are designed for teachers with a lot more time and resources than you have. The bottom line: you can do multimedia if you keep it simple. I follow the K.I.S.S. rule: Keep It Simple to be Successful. If you keep it simple, you and your students can get in and out of multimedia before the bell rings.

How is this possible? Teachers have been doing this for years, and I've been writing about it in my Sandbox column in *L&L* magazine for almost as long. In-

genious teachers around the country have learned how to do multimedia on a shoestring. They have scarce resources, too little time, and not enough training or experience. Despite all this, they're still successful! They use equipment and other materials already on hand, and they produce the most amazing multimedia reports, portfolios, science projects, multimedia poems, and more with their students. Their trick is that they let the students do the work themselves. The teacher's job is to manage the overall process to make sure the kids meet their deadlines and that their multimedia creations are infused with solid content from the curriculum.

The key to success in your classroom is to trust your students. They have great ingenuity and they can't wait to get their hands on these new authoring tools. You need to give your students just enough information about the authoring tools to get started. After that, they will learn best from hands-on practice with their creations. They will teach each other. And they will teach you!

### Send Me Your "MUD Pies" (Student Web Pages)

Hopefully the "Froggy Mystery" Web page and activity (described in the "MUD Pie School Research Project" inset on page 61) is just the first of many home pages at MUD Pie School. But the rest is up to you!

I invite all of my Sandbox column readers to send in their Web pages so that I can publish them on the Internet alongside our Froggy Mystery Web page. In the future I hope to have a huge gallery of student- and teacher-produced pages on every subject imaginable. I have great faith in teachers and students. I feel certain that the Web pages you create may be simple, but they will also be original, fun, and different, in addition to serving as helpful examples to other teachers and students all across the world.

In the long term, I hope to see students and teachers take on more of the teaching duties at MUD Pie School and use their

Web pages as classrooms, such as the ones we've already developed—Dr. Franken-Fred's Lobotomy Lab, Detective Fred's Froggy Bottom, and Captain Fred's Diner.

Send your MUD Pie Web page on a Macintosh or PC disk with a disk label showing the file names of the files that are included, the computer platform (Mac or PC), and the names of the media files (images, sounds, etc.) that accompany the Web page. Also, put your name and phone number on the disk label so I don't mix up our MUD Pies! Last, on a separate sheet of paper, I will need a brief release from you and your students to display your work on the Internet (by the way, we have elaborate editing procedures to protect children's privacy and safety!) Please send your materials to: Dr. Dejeuner, Principal, MUD Pie School, at the address at the end of the article. I will send you a postcard within two to four weeks after receiving your MUD Pie to confirm that I have received your disk.

I hope you will go out on the Internet and visit MUD Pie School. You may also want to come to my Spotlight Session at the 1997 National Educational Computing Conference (NECC '97) in Seattle.

### Special Offer

What do you do if you are not on the Internet, and not sure how to start? As a special offer to readers of this column, I am making available copies of my MUD Pie CD-ROM, for \$25, which is the cost of production (the retail price is \$50). This CD includes everything you need to learn the basics to get started. Also, I would like to offer you the *Teacher's Cookbook* (at cost) for \$10. You can send checks to the address above, and include \$3.00 per item for postage and handling.

Good luck! Be bold, creative, original, and inventive, and, above all, trust your students. I'm eager to display your MUD pies online! ■

*Fred D'Ignazio is the editor of the Multimedia Sandbox column. Fred can be reached at Multimedia Classrooms, Inc., 1773 Walnut Street, East Lansing, MI 48823; digazio@msen.com.*

# MUD Pie Faculty

The MUD Pie Faculty can show you how fun it is to do authentic publishing activities using multimedia and the Internet.

1

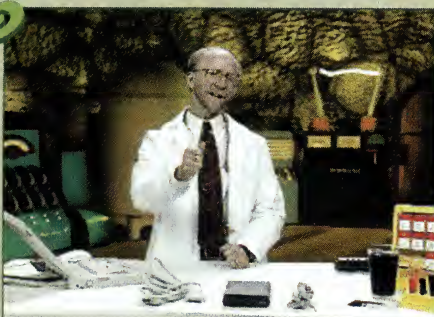
Use real-world research tools to gather materials for your Web page.



Froggy Bottom and Detective Fred

2

Set Up a multimedia workstation to capture your research onto the computer.



Lobotomy Lab and Dr. FrankenFred

3

Do research online and copy and paste it into your Web page.



Unlimited Library  
and Professor Freddy Higginbottom

4

Interview experts online and paste the interviews into your Web page.



MM MUD Buggy and Captain Fred

5

Assemble images, text, and sounds onto your Web page and publish it on diskette, on a hard drive, or on the Internet.



Fred's Diner and Chef Fred

## MUD PIE SCHOOL RESEARCH PROJECT

## Froggy Mystery

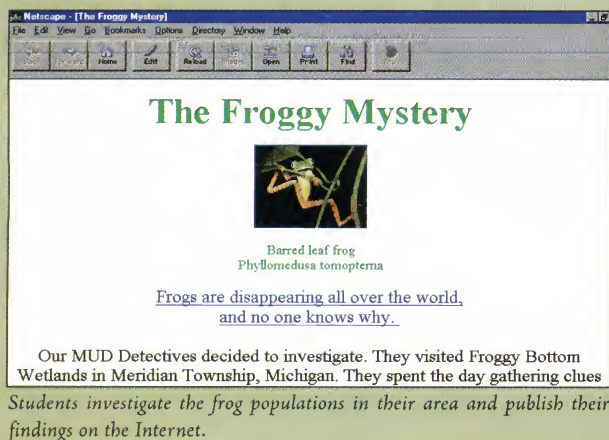


## What Is Happening to the Frogs?

Did you know that frogs are vanishing from their wetland habitats all over the world? This startling finding has scientists in many countries worried, because frogs and other amphibians are generally the first creatures in the ecosystem to be affected by ecological and environmental changes. If the world's environment is becoming hostile to frogs, what might that mean for humans and other species later on?

The chief question we want to answer through the research we're doing in the Froggy Bottom research project is "Why are frogs vanishing from their habitats?" This project meets all the criteria for authentic publishing: it is timely, it is meaningful to people all over the world, and it allows students to make a real contribution to our understanding of the problem by observing what is happening in their own communities. Furthermore, this project is exactly the type that would be enhanced by using the Internet to conduct research, collaborate with others, and publish our results. All 24 of the lessons at Froggy Bottom are about developing a Web page on vanishing frogs.

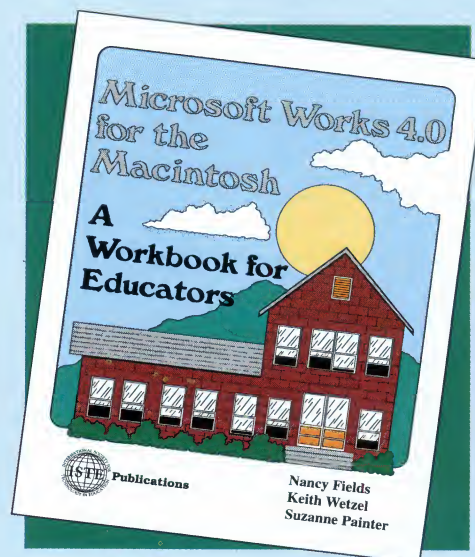
You and your students could use this topic, or another like it, as a theme for doing multimedia research, authoring, and publishing Web pages in your classroom.



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Nancy Fields, Keith Wetzel, & Suzanne Painter  
*Microsoft Works 4.0 for the Macintosh—A Workbook for Educators*  
206 pages, 1 disk, ISBN 1-56484-126-X  
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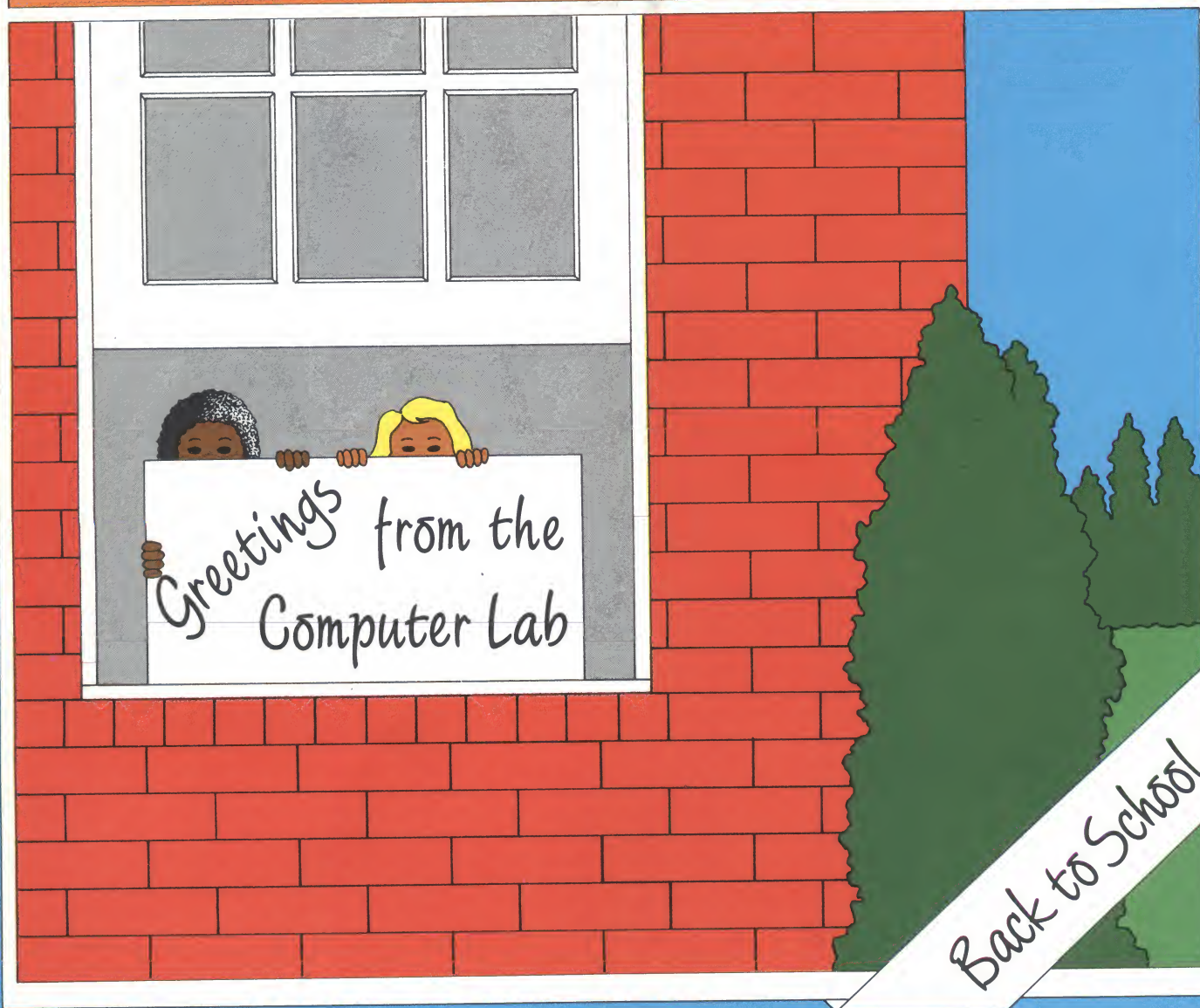


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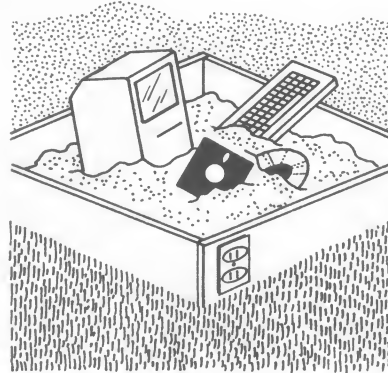




## Multimedia Sandbox

### Welcome to the Multimedia Sandbox!

by  
**Fred D'Ignazio**



*This issue inaugurates a new column by Fred D'Ignazio. Fred has been creatively involved with a variety of media. He has authored books and software. His articles and columns have appeared in publications as varied as Highlights for Children and The Washington Post. He has organized multimedia telecommunication links, and written commentaries for ABC-TV, PBS, Discovery Cable, and National Public Radio. His teaching experience includes faculty positions at institutes in Brazil, Portugal, England, Canada, and the U.S. (most recently at Simon Fraser University and Lesley College). Fred has presented multimedia workshops in more than 60 school districts around North America. We look forward to exploring the world of multimedia with such an experienced guide.*

#### Desktop Fusion

In the next five years computers will become the hub of classroom multimedia centers that fuse audio, video, computing, and telecommunications technologies into a single desktop workstation. With the next generation's high-speed CPUs and optical read-write storage devices, teachers and students will be able to navigate through billions of printed words, sequences of live-action video, photographs, diagrams, human voices, and high-fidelity music as effortlessly as they now scroll through screens of text. They will use their computer as a multimedia publishing center to mix words together with moving pictures and sounds into multimedia "documents." They will be able to publish these documents on paper, diskette, audio cassette, videotape, or laser

disc, right in their own classroom. Or they can *telepublish* their multimedia documents over phone lines to distant pen pals and fellow multimedia explorers.<sup>1</sup>

Student and teacher researchers will create and navigate their way through "hypermedia" databases which offer them many pathways through information stored in the computer. They will build the databases from multimedia data, including broadcast TV segments, educational videotapes, live interviews, taped phone interviews, e-mail "eye-witness reports," radio shows, photographs, passages of text, and scanned images taken from magazines, books, and pamphlets.

#### Applying Multimedia in the Classroom

As with any other technology or innovation, multimedia contains no magic of its

own. It can become a valuable tool only when a teacher sees it as merely one element in a well-constructed learning environment. Based on three years of classroom observations, I found that teachers who are the most successful with multimedia introduce it in a learning environment that encourages the simultaneous development of other supportive skills, including:

- cooperative learning.
- higher order thinking skills.
- group problem-solving.
- risk-taking, improvisation, innovation.
- oral and written communication skills.
- learners taking responsibility for their own learning.
- development of learners' self-concept and self-esteem.

In addition, teachers who are successful with multimedia use it as a tool for themselves as well as their students. Depending on their style, some teachers teach themselves multimedia; others learn it from their fellow teachers or from their students. Teachers who are successful find ways to use multimedia personally to:

- make presentations.
- transform textbook materials into a

multimedia format.

- conduct original research.
- bring new life to "tired" knowledge.
- renew their commitment to teaching.

In addition, teachers have raised many questions about multimedia. In this column we will explore

- how teachers do multimedia with one computer and 30 students.
- how *one* teacher can oversee students who are using multiple (audio, video, computer, and telecommunications) technologies.
- whether multimedia will raise teachers' skills or automate teachers out of the classroom.
- how teachers and students who incorporate published multimedia materials into their own works can avoid violating copyright law.
- using multimedia for accelerated learning.
- whether multimedia tools are intended for *teachers* or for *kids*.

### The Multimedia Sandbox

The *sandbox* is a metaphor for a learning environment that is emerging in many schools around the U.S. and Canada as we enter the 1990's. In a multimedia sandbox teachers and students see themselves as learners and explorers who sculpt new worlds of knowledge out of the raw materials at hand.

In this column there will be an emphasis on practical techniques, strategies, and ground rules that computing teachers can use to get started in multimedia. Some of the areas we will cover include:

**Scavenged Multimedia**—Teachers can start multimedia computing on a shoestring by enlisting the help of their colleagues, their students, and the community. They can scavenge equipment commonly found around most schools (including a computer, a TV, a VCR, and a cassette recorder) and assemble a multimedia center that can be wheeled around the school on an AV cart.

**Hypermedia**—What is hypermedia? How do you do it? How much does it cost? We'll look at hypermedia on the Apple II, Macintosh, Commodore Amiga, and on MS-DOS computers, and suggest some sample lessons to get teachers started.

**Digitizing**—Multimedia is possible because we now have the tools to *digitize*, or

convert, non-computer (video, audio, photographs, and print) media into computer form. We will look at scanners and at video and audio digitizers that can be used in the classroom.

**Optical Media**—It is getting easier to hook your computer to different kinds of optical media, including linear (e.g., videotape) and non-linear (e.g., videodisc, CD-ROM) media. We will look at ways the computer can interact with video cameras, VCRs, videodiscs, and CD-ROM discs. Such concepts as frame-grabbing, genlock, video overlays, audio dubbing, and editing will be translated into English and evaluated.

**MIDI**—There is a revolution going on in the field of electronic music that can enrich the multimedia revolution in computers. New MIDI (Musical Instrument Digital Interface) cables and devices make it possible to plug your computer into a musical instrument and create rich sound tracks for teachers' and students' curricular presentations. We'll look at what MIDI offers to the classroom teacher and see how you can get started.

**Multimedia Publishing**—Multimedia isn't just for student navigators; it's also for student *authors*, *producers*, and *publishers*. We'll look at multimedia authoring systems that teachers and students can use to create their own interactive curricular presentations.

### Distance is a State of Mind<sup>2</sup>

In a *real* sandbox, of course, life is not always peachy keen. Think back for a moment. Perhaps there were cold, grey mornings when your mom placed you in a sandbox and you really didn't feel like playing there. Or maybe it had rained, and the sand was soggy and lumpy and scraped against your bottom. Or maybe you were forced to share your sandbox with regiments of ants or a cat who mistook your learning environment for a king-sized litter box.

Picture a teacher and her students wrestling with multimedia cables, trying to figure out why the computer won't talk to the VCR, struggling with image file formats, and grappling with gargantuan sound files which overflow floppy disks.

Now picture a teacher and students sitting at a classroom multimedia center assembling book reports, term papers, and group projects from data captured from *primary sources* all over the world—interviews with real-life experts, modem conversations with teachers and students who live on other parts

of the planet, photographs of the students' own town, sounds from the school playground, voices from TV documentaries, and local newspaper articles from the 1930s. Who are these people? The same teacher and the same students!

Multimedia exploring can be a real struggle, but it usually pays off in a big way. Teachers and students who become multimedia explorers get to go where no one has gone before. They get to tackle problems never encountered, gaze on vistas never seen, build structures never imagined. They are the first to explore rich multimedia representations of curricular knowledge. The process is often exhausting—and exhilarating!

What does it take to be a multimedia explorer? Multimedia explorers are no different from any other explorers—they must be risk-takers, mistake-makers, can-doers, and improvisers. They must frequently attempt the impossible. But if they are successful (and they frequently are!), they can fashion a classroom without walls, a classroom in which learners have access to sources of knowledge from around the world, a classroom where distance is only a state of mind.

You are invited to join me on a series of expeditions into the multimedia future. Perhaps you are already experimenting with multimedia and hypermedia in your classroom with your students. As a fellow explorer you are an invaluable resource. Please share with us the sights you've seen, the sounds you've heard, the maps you've constructed, the insights you've experienced—and the black holes you have survived! Take a moment and drop a note (or send a videotape, an audio cassette, or a diskette) to the address below and we will showcase your "scouting report" in future installments of this column.



[Fred D' Ignazio, "The Multimedia Sandbox," 1302 Beech Street, East Lansing, MI 48823; AppleLink: X1110; Bitnet: USERNLLH@SFU.]

<sup>1</sup> Credit for the term "desktop telepublishing" goes to Dr. Gerri Sinclair, professor at Simon Fraser University in Vancouver, British Columbia and a pioneer in desktop telepublishing.

<sup>2</sup> Credit for the phrase "distance is a state of mind" goes to Kathleen Forsythe, Supervisor, Learning and Technology, for the Greater Victoria School Board, Victoria, British Columbia.

D'Ignazio, Fred. WORKING ROBOTS. Elsevier/Nelson. CIP. 1982. 149 p. \$11.50. Grade Level: 7 and up. KHR

D'Ignazio has written a thorough, well-documented introduction to robots and robotics. He describes present uses of robots in industry, science and the classroom, gives practical advice to beginning robot builders and discusses the future of robots in our economy. He includes a glossary of terms and many sources of materials and information.

Bklist 4/1/82; BCCB 6/82; HB 4/82; SLJ 5/82

Checklist, Ohio 11/82

D'Ignazio, Fred, WORKING ROBOTS, Elsevier/Nelson, 1982, \$11.17, (Wooderson)

D'Ignazio discusses how robot computers are programmed; how the robots function; and how their intelligence compares to human intelligence. This is not a how-to book with the exception of one chapter which briefly discusses the theories involved in robot building. There is a good index and the book provides good basic information for the layman. Accompanied by good photographs, the material is presented in easy-to-understand terminology. Recommended. Grade level: 6-10. Interest level: 6-8. APP/ Fall '82, p. 20. BCCB/ 6-82, p. 186. Bklist/ 4-1-82, p. 1017. HBk/ 4-82, p. 195. SLJ/ 5-82, p. 68.

Missouri State Library Review 10/82

D'Ignazio, Fred. WORKING ROBOTS. Elsevier, 1982. 11.17 (5-9) Books worth Reading  
Present use of robots, chiefly in industry but also in home and classroom, is described with many photos and a good bibliography. Miami-Dade pub. Lib. Fla. 4/83

Children's Science Books, Chicago, Ill.  
WORKING ROBOTS by Fred D'Ignazio, New York, Elsevier/Nelson Books, 1982, (\$11.50).  
7-Up Presents an overview of the various kinds of working robots or intelligent machines and their growing impact on the economy and society.  
Rev.: BCCB 35 (June 1982):186. 12/9/82

D'IGNAZIO, FRED. Working Robots. (Illus.) NY: Elsevier/Nelson, 1982. xiv + 149pp. \$11.50. 81-17279. ISBN 0-525-66740-7. Glossary; Index; C.I.P.

JH, SH ★★ This is an important book. Lucidly and thoughtfully written in good prose, *Working Robots* is accessible to the advanced seventh-grade reader with technical interests and should be accessible to all high-school students by the time they reach the senior year. The narrow focus indicated by the title belies the breadth of this work. The book is not about the robots of the fiction writer's imagination but is an excellent introduction to the down-to-earth robots that are now entering our everyday lives in farm and factory and in home and school. This book requires no special knowledge of mechanics or electronics; the 12 chapters cover, at a conceptual level, most of the important technical aspects of robots, including the technical limitations of current robots and prospects for the future. An excellent examination of current and future uses is also provided. Most importantly, the social aspects of the working robot are dealt with in a straightforward and thought-provoking way. In a real sense, *Working Robots* is a primer of the second industrial revolution that will profoundly effect the lives of the readers to whom it is addressed. These young people, in their maturity, will have to deal with the earth-shaking implications of this revolution. D'Ignazio's book should be required reading for every American teenager. —Maury Tigner, Cornell Univ., Ithaca, NY

Science Magazine, Wash. D.C.  
Nov./Dec. '82

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D'Ignazio, Fred  
CHIP MITCHELL: THE CASE OF THE STOLEN COMPUTER  
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With spunky computer-brain sleuth Chip Mitchell around, no computer crime goes unsolved. Whether it's machine fixing in a pinball arcade or a silicon chip robbery, Chip can unravel the mystery — with a little help from his computer, Herm. This is the first book in a

series. Computer and mystery buffs can try to match their wits with Chip and not peek at the solutions to the crimes given in the back. Middle school and junior high. 3330 7628

# computing for families

Beyond The Desktop: Soap Bubbles,  
Forests, And Hot-Air Balloons

Fred D'Ignazio  
Associate Editor

In May 1986 I was deep in a giant cereal bowl known as the British Columbia Hockey Arena. Sitting high above me on wooden bleachers were over 7000 people, their faces distant and indistinct. In my speech, I said that we computer people already had plenty of good ideas. What we needed desperately were new *metaphors*—vivid images to set fire to our imaginations. I suggested the sandbox as a metaphor for human interaction with computers and other high-tech equipment. Sand is an excellent medium for young children's hands and minds, something that can be shaped, squashed, and reshaped—a medium that is gritty and stimulating to the senses, but which doesn't get in the way of the child's imagination.

Later in the day, Becky Lowenthal from Australia rushed up to me and told me that her own metaphor was soap bubbles and bubble baths. For Becky, soap bubbles evoked images of flight, beauty, geometry, nature, and freedom. They could be shaped and they sprang from a bubble bath—a warm, relaxing treat.

Becky's bubble bath and my sandbox represent human/technological metaphors—higher-order patterns which integrate human/machine capabilities with our wishes and desires and transform them into vivid images which we can relate to emotionally. We are firmly in control of the medium, and the medium stimulates and *celebrates* our senses and our imagination. And, last, both metaphors are dreamlike and extremely nontechnical.

## The Forest In Your Mind

Designers of both computer hardware and software have created some powerful mental structures—

thinking environments—which we can “model” in our own everyday thinking and problem solving. We can manipulate words inside our heads using our own internal, intuitive word processor or desktop publishing program. We can organize information in spreadsheet or database formats, structure and prioritize according to idea processors. We can solve problems algorithmically and methodically, just as we would program them on a computer.

Computer scientists love to speculate about an imaginary computer known as the Turing Machine (after Alan Turing, the famous computer scientist). The Turing Machine is so powerful it can imitate any other computer. But the human imagination is even more powerful. It can model any Turing Machine.

Word processors and database programs are exciting, but let's face it, they are creatures of the desktop. Our human world extends far beyond the desktop—to the highest, windswept mountains, to the frothiest seas, and into the deepest forests.

We are on the threshold of a new era of multimedia computing which will carry us away from the desktop into the broader human world. Electronic technology is swiftly becoming digital, and compact discs (CD-ROMs, and so on) will soon become less expensive and more versatile. In the near future, when we sit down at our personal computer we will face not only trashcans and file folders, but also mountains, seas, and forests—simulated in digital high-fidelity sound and full-motion animation.

Now I ask you: Is it appropriate to enter a forest through a file folder?

You be the judge. But for my part, I would rather enter this new, multimedia computing world through a more imaginative human/

computer interface: by skiing down a Colorado mountain with fresh powder snow sprinkling my nose, or by fishing in a deep glacial lake, guarded by tall, green pine trees under a blue sky.

Or by floating in a hot-air balloon.

## Pretend You Are Jules Verne

When I bring my multimedia dog-and-pony show to children, I have them close their eyes and pretend they are Jules Verne, floating in a hot-air balloon, high over the earth.

When they open their eyes and look down at the earth, they see an enlarged poster-size picture of a Motorola 68000 microprocessor. “Pretend this is a city below you,” I tell them, “A giant city—a New York—with its neighborhoods, its flower, business, commercial, and artistic districts. There is a hustle and bustle of activity. What can you see?” And the children see data being processed as noisy, colorful parades; they see memory circuits as tall skyscrapers. They can feel the microprocessor's functionality and the system-wide integration, just as you can hear the pile drivers tearing up a New York City street, smell the Chinese vegetables in a nearby open-air market, and feel the rumble of the subway passing beneath your shoes.

We have an unquenchable thirst for metaphor. It is time for us to start designing fresh, new metaphors for our computers. Desktops can carry us only a baby step into the future. The human imagination can handle so much more!

# A robot can't kiss, but it will shear sheep

By JOHN IZBICKI Education Correspondent

IN a modest apartment overlooking a busy north-west London thoroughfare, more than a dozen headmasters from five countries are being taught exactly what robots can and cannot do, and how to work them.

The heads taking part in this intensive course in "Robotics Literacy" — a course they will shortly pass on to thousands of pupils in India, America, Israel, Italy and France have been told for instance, that "no robot will ever be able to kiss sensuously."

Nor will he/she/it, however sophisticated the mechanism, be capable of setting a fracture, acting as a midwife, removing an appendix or playing the violin (although violin music could be synthesized).

But heads can expect their robots to be able to play the piano and spray paint on assembly line objects such as cars and cut cloth with a laser. Soon they will also vacuum rugs without tripping over obstructions, walk on two legs, and shear sheep.

Some of the most up-to-date will even be capable of setting a table—and clearing it—making beds, picking locks, tuning cars, changing tyres,

repairing punctures and dancing in a theatre chorus line.

The "classroom" overlooking Finchley Road underground station, has the appearance of a composite scene from several "Dr Who" series, and lessons are accompanied by the familiar sci-fi sounds of bleeping computers and whirling robots.

But this is no fiction. "We must bring it home to as many youngsters as possible that if they are to meet the challenge of the future, they will have to be completely literate in this new technology," Mr Joseph Harmatz says.

He is director general of World O R T—the international organisation of rehabilitation through training, which runs vocational schools and technical colleges.

The course will be good for British business as well, for most materials used are British-made. The Smart Arms 6EP miniature robot connects to the B B C. computer.

Dr Rhodes Boyson, the Schools Minister, recently took a close look at some O R T schools in Israel and was hoping to introduce some of their methods of vocational and technical training to British comprehensives.

↑ Fred's Class!

# Daily Telegraph

FINAL

LONDON, MONDAY, MAY 23, 1983

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SUNNY  
High Sunday in mid 80s  
(29c). Low tonight in  
low 60s (16c-17c). De-  
tails, page 5A.

# THE RALEIGH TIMES



Vol. 95, No. 134

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Raleigh, North Carolina, Saturday Afternoon, June 5, 1982

50 Pages

25c

## Programmed Computer rapidly becoming a kid's best friend in school

By SHARON KILBY  
Times staff writer

"Once upon a time, computers were like huge brontosaurus, with cables as thick as jungle snakes and thousands of tubes that looked like hot glowing pickles. They belched out the answers to arithmetic problems at the rate of one per second.

"Over the years, the python-sized wires shrunk to the size of ropes, then strings, then threads, then hairs — until today, the contents of that room-sized computer fit into a tiny pea-sized chip that can whiz through a million addition problems a second."

With that description, Fred D'Ignazio, a Chapel Hill author of children's books about computers, delighted an audience of Olds Ele-

mentary students in Raleigh recently.

The subject was the school's microcomputer, installed last month.

The microcomputer is a desktop appliance composed of a television-like video monitor and a typewriter-like keyboard. Like cars, they come in assorted models with intriguing names — Apples, TRS-80s, GIGIs — and with an assortment of accessories.

They allow teachers to draw on a host of pre-packaged educational programs, called "software" or "courseware," that come on discs resembling 45 rpm records, called "floppy diskettes."

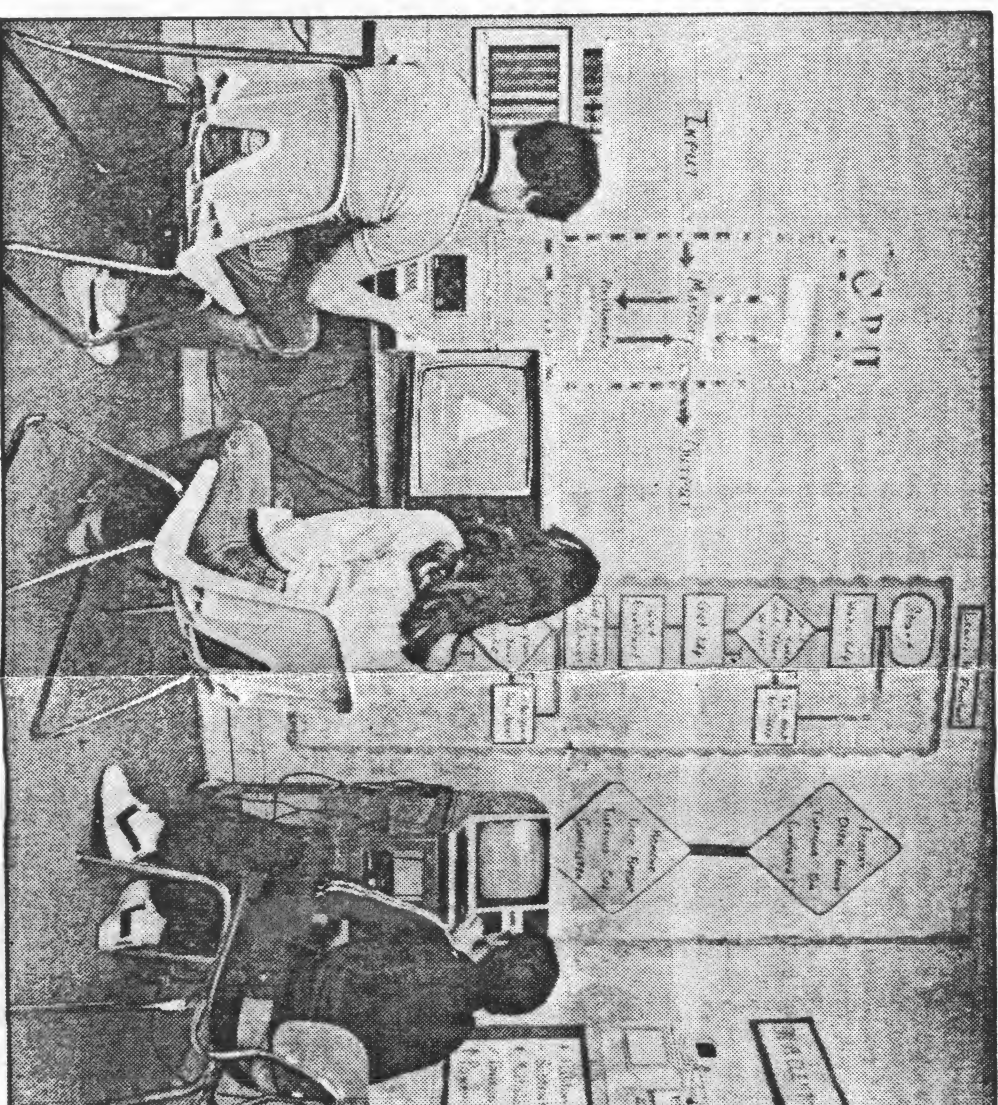
In Wake County schools, terminals and floppy diskettes increasingly are popping up alongside blackboards and chalk. And as

generations past were comfortable with chalkdust on their hands, today's students are at home with the microcomputer technology that also brought them Pac Man and Asteroids video games.

A precise census of the Wake school system's microcomputer population does not exist, because individual schools and PTAs have supplemented computers purchased by the central office. This school year there were 35 Apple microcomputers (the only brand the central office inventories) in the schools, one each in eight elementary schools and the rest in junior and senior highs.

Olds' recent purchase, paid for by the PTA and the school's ex-

See COMPUTER, page 2-A



Students at East Millbrook Junior High work with microcomputers

officials say Wake leads the state in use of computers in schools

Times photo by Harry Lynch

# Programmed

## Computer rapidly becoming a kid's best friend in school

Continued from page 1-A

tended-day magnet, and new microcomputers at Kingswood and Jeffrey's Grove bring to 11 the number of elementary schools using microcomputers.

"In North Carolina, there isn't any doubt there's more action in Wake County schools than in any other in the state," said Edward G. Blakeway, who retired three years ago as head of the School Computer Education Center at N.C. State University, which helped the state's school systems establish computer education programs.

Use of microcomputers in Wake County will escalate this fall with the introduction of systemwide magnet programs. The school system has acquired 38 Apple and about 25 GIGI microcomputers. All are destined for magnet schools, which attract voluntary enrollment by their program offerings.

They will be used in classrooms to teach students how to operate computers.

Access to a computer is an attraction for students. "We (adults) stand back to see if it's going to bite and they (students) just jump in there and take off," said George B. Cooper, Olds principal.

Richard J. Murphy, assistant principal at Athens Drive High, agreed. "Most of the junior highs now have computer clubs," he said. "One of the main interests of the students coming to Athens now is, 'Where are the computers and how accessible are they?' ... We're behind right now. It's not a luxury item. It's a necessity."

In the eight local elementaries that have them, microcomputers are used as a supplemental tool. Teachers work with small groups on pre-packaged instructional programs, usually focusing on basic math, English or social studies skills. Computers also are used to drill for remedial work. The time spent with computers normally comes from the time allotted to the subject under study.

Most junior highs offer an elective computer interest course, in which students are introduced to computers and are taught basic programming. Computer math courses may be offered later.

High schools also offer introductory computer courses, as well as courses that combine computers and math, such as Algebra II with Computers, an honors course. Microcomputers also are used in high school business courses, such as data entry and data processing.

The way students get to use microcomputers depends on their education level and their personal inclination.

Some teachers say the microcomputer is a valuable instructional aid for young children. Students who groan when given a worksheet of math problems will work 40 to 50 computer-generated problems with enthusiasm, some teachers claim.

Graphics and the microcomputer's Dale Carnegie-like friendliness make the work fun, they say. ("Great, Mary. That was very good," one microcomputer says to a student answering correctly.)

A program that tests knowledge of measurements, for instance, displays four quart bottles and a gallon jug filled with milk. A wrong answer results in an empty bottle or spilled milk.

But critics have charged that such use of computers turns them into just another expensive audio-visual aid, alongside recorders, projectors and television sets.

Claire Patterson, Wake schools' supervisor of instructional computing defends computer-assisted instruction because, she said, it encourages a positive approach to problems. In class, students often don't get a chance to right their wrongs. On the computer they do, and the computer won't embarrass them when they're wrong, she said.

"The biggest problem for the students is to learn to think, not am I right or wrong, but how can I fix it," she said.

Simulation games provide practice with situations that cannot be duplicated readily in the classroom.

Recently, six Bugg Elementary fourth-graders exercised their business judgment in a game of Lemonade Stand.

The Apple microcomputer set up the situation: the assets, the cost of a glass of lemonade, the cost of signs for advertising as well as variables such as weather and increased cost of raw materials.

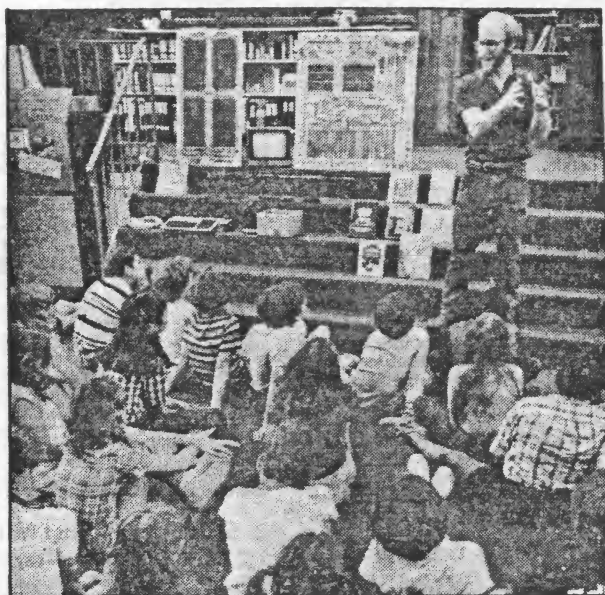
The students weighed the factors to make decisions, such as the charge per glass, the amount of lemonade to produce and the number of signs needed. A computerized total of the sales and profits for the day told them whether their judgment was sound.

When the bell rang, the students didn't want to leave. "I wish we could stay here all day," one girl grumbled as she gathered her books for her next class.

At the junior high level, students have gone beyond plugging into pre-packaged programs to producing their own. One recent afternoon, East Millbrook Junior High students showed off educational programs they had written themselves, by typing in a set of instructions in BASIC, a language their two microcomputers understand.

Those instructions told the microcomputer what problems to pose, how to respond to users' answers, and in what order to proceed.

One began, "Hello, Catherine. This program will quiz you on your multiplying skills from one to 10." Because the programmer had included an instruction called a "random numbers generator," the computer came up with different problems each time the pro-



Times photo by Harry Lynch

**Fred D'Ignazio explains about computers**  
Fred Olds Elementary class was an attentive audience

gram ran.

At Enloe High, students Paul Ramsey and Bill Nussev are collecting royalties on a program they wrote and sold to a national marketing company. Their program is designed to simplify programming, particularly the making of graphics, for less skilled users of the TRS80 home microcomputer.

Even those who aren't computer whizzes are gaining a familiarity with computers that some educators say will be as essential as a solid grounding in the three Rs.

Sharon Irby, who teaches the East Millbrook Junior High computer course, said some students never will be able to write more than the simplest program.

"But they can use (the microcomputer) and feel comfortable with it," she said. "An earlier generation facing anything mechanical automatically says, 'It's a computer. I can't use it.' This generation won't have that problem."

Richard A. Usanis, head of N.C. State University's computer center, said even fields of study farthest removed from technology, such as the humanities, are making increasing use of computers to solve research problems.

"Somewhere in this decade we'll be expecting incoming students to have an ability to use the computer," Usanis said. Eventually, he predicted, students will bring their own microcomputers to college.

D'Ignazio, who was a computer programmer before he turned writer, said microchips will be turning up in all the familiar crannies of our lives. Whether people turn to law, medicine or ditch digging, he said, their lives and their language will bear the indelible mark of the computer.

Already, he said, computers are choreographing dance, making music, imparting "intelligence" to household appliances, and fulfilling the functions of the damaged limbs of handicapped persons. Households will depend on them for entertainment, budgeting, shopping and communication.

"Any machine up to this point had a special function and could amplify human effort," D'Ignazio

said. "The computer has no special function. Its domain is knowledge. It can manipulate and structure knowledge."

He sees some problems with the way computers are used in schools.

"What I worry about is that the computer becomes pretty much a black box and just another visual aid," he said.

He believes children should learn from the earliest age how to use the computer as a tool, not just an educational aid. Canned courseware, he said, does not teach that.

"Some of the software is great," he said. "But it is coming from outside. Even if it accomplishes learning objectives, it puts the teacher in the back seat."

Mrs. Patterson hopes the new GIGIs, a donation from Digital Equipment Corporation, will address that problem. They come with an "authoring language" that will make it possible for non-technological teachers to write their own programs. The courseware for the magnet programs, she hopes, will be written by the teachers who will use them.

In addition, the system has obtained software in a new language called LOGO, which simplifies programming so that even the youngest child can learn to put the computer to his own use, designing his own graphics and programs.

D'Ignazio raises other issues that fall into the realm of philosophy and ethics.

"Computers can become so pervasive and so good at simulating that we stop dealing with life," he said. "They can take over so many functions that cause us to get out of our houses and to deal with people. That's a very dangerous thing. We're already separated enough."

But there's no stopping them, he said. The ethical problem was inherent in the question raised by an Olds Elementary student.

"Do computers know what they are doing," she asked.

D'Ignazio's answer: "As smart as computers get, they will never know what they are doing. Young people will be the masters. They will hold the keys to the future for computers."

# Patrick Henry students write book on computers

By CHRIS GLADDEN  
Staff writer

The programs some Patrick Henry High School students are putting on TV screens these days are going to put the students in a book.

Writer Fred D'Ignazio is working on a book aimed at helping parents teach their children with and about computers. Hayden Publishing Co. encouraged D'Ignazio to get some young people involved. So D'Ignazio approached the Roanoke school system with the idea of having some students help him with the book.

His groundwork — and the close proximity of his house to Patrick Henry — led

him to the computer science class of David W. James.

James was delighted with the prospect of having some of his students collaborate on a book and the students were pretty happy themselves.

"It's exciting having your first software published," said Howard Boggess, a junior. "In Time (magazine), there's a 16-year-old making a fortune on his software."

These students won't be making a fortune from this book, said D'Ignazio. "They're very underpaid. They'll get a copy of the book and a pizza party."

They also will get individual credit in

the book for the programs they develop and a short autobiographical passage with a little background on each student telling why the student is drawn to computers.

The programs are learning exercises in game format.

D'Ignazio offered guidelines but left it up to the students to develop the program.

Angela Bradshaw worked out an exercise in subtraction based on disappearing ghosts. A number of ghosts pop up on the screen. The second time, fewer pop up on the screen. The youngster has to count the ghosts and enter the answer into the computer.

Beth Ann Hostutler and Joni Burdette

developed an exercise in which a king counts the diamonds in different rooms of his castle. The youngster working the puzzle has to figure out the number of diamonds. The girls designed the diamonds and king. They compare working with computer graphics on a screen to working on graph paper.

Mack McGhee came up with a multiplication exercise using people and hamburgers. Boggess' software involves a division exercise using pizza and people called Pepperoni Please. Howard Levine, a sophomore not taking computer science, helped Boggess and McGhee.

Staff photo  
by JACK GAKING

Second-year  
students (from  
left) Beth Ann  
Hostutler, Joni  
Burdette and  
Angela  
Bradshaw  
practice at  
computer  
terminal



# Computers

From Page S-1

Scott Rainey and Brian Francois came up with a multiple choice exercise; Melissa Perdue developed two exercises.

The book is aimed at Atari computers but D'Ignazio said the exercises will be translated for use with five other major computers. Discs with the exercises on them will be available and the programs will also be printed in the book so computer owners can enter them into their home computers.

The title of the book is "Beyond Video Games — 40 learning games on your

home computer." D'Ignazio calls it "an alternative to TV and a tutorial for the whole family." It's scheduled to come out in paperback this summer in a printing of 40,000.

"The drawings the kids did are the most elaborate in the whole book," D'Ignazio said.

While his peers are feeding quarters to Pacman at a furious rate, Levine would rather "program a computer than play games on one."

"I played video games but now I prefer to play my own," said Boggess.

Other students, such as Miss Hostutler and Miss Burdette, both second year computer students, didn't start playing video games until they took computer classes. Some of the students have home computers.

"I selected some of the more motivated students for the project," said James.

This was obvious on a recent visit to the school. After a full day of classes, several of the students lined up on the school's computer terminals for a challenging "Star Trek" game, zapping the Klingons into oblivion.

# 'Househusband' turns kids on to computers

By TRISHA COFFELL

Daily Times Staff Writer

**MEDIA** — Relying on his four-year-old daughter as editorial consultant, and his wife as motivator, Fred D'Ignazio has come up with an innovative children's book on computers.

His book, "Katie and the Computer," is a combined educational and adventure tale about a little girl who falls through the front of a computer much the same way that Alice walked through the looking glass.

Instead of a wonderland, Katie finds computerland.

D'Ignazio, son of Mr. and Mrs. Silvio (Babe) D'Ignazio of Media, patterned his female heroine, Katie, after his four-year-old daughter, Cate. Through a series of adventures with the Colonel (control program), the Bytes (information units) and the computer Bug — Katie learns about the inside of a computer.

D'Ignazio is a doctoral candidate in computer science at the University of North Carolina — thus his expertise in the workings of computers. He also refers to himself as a "house-husband." His wife, Janet, is the breadwinner, and he takes care of the home and two children — thus his expertise in the workings of a young mind.

D'Ignazio said he started to work on the book two years ago on his wife's suggestion.

"We were driving home one night and Janet suggested I start writing. She said Cate was always banging on the keys of my computer, and what if she fell through the comput-

er one day and went inside,"

D'Ignazio said.

"I was so excited about the idea, we stopped at the Pizza Hut and I began taking notes on the napkins."

## EDUCATIONAL

D'Ignazio combined his efforts with those of illustrator Stan Gilliam, and after months of work and research, the two men created "Katie and the Computer." The book was released Friday from the New Leaf Bookstore in Media.

"The story is entertaining plus educational," the author said. "It combines the elements of good versus evil, there is adventure, and there are the facts about computers."

D'Ignazio said he read sections of the book to his daughter as he progressed. Cate would then react, indicating slow parts through boredom, exciting parts by enthusiasm, and rejecting words she could not understand.

"It was really a fun experience and Cate was involved from the very beginning," D'Ignazio said.

The author said computers are becoming a significant factor in modern living, but many people don't understand them and are threatened by the advanced, futuristic technology.

Computers appear in our daily lives in the form of calculators and computer games.

"By the year 2,000, they will be very much around us," he said. "They will be in home appliances, but we won't even see them."

D'Ignazio said he is more oriented

Towards computers for children, as a learning tool.

"They would be good as a 'what-if' machine. Computers have the ability to simulate reality. They can synthesize music, voices and come up with images," he said. "Computers can help children visualize reality. Instead of stuffy words in a text book, they can make a two-dimensional picture on a computer screen."

D'Ignazio said he also hopes his children's computer book will rub off on the adults who read it.

## TOO COMPUTERIZED

"I'm looking for doors to teach people about computers," he said. "There is a danger that we can be too computerized. I'm not in favor of having the computer around as a gimmick, as a 'gee whiz' phenomenon. And I don't think computers should be used as scapegoats (when people blame mistakes on computers.) But they do have a place in our lives."

While "Katie and the Computer" is D'Ignazio's maiden literary effort, he said he is also working on a book on his experience as a househusband. The projected title is "Coping with Confusion: The Harried House-husband's Guide to Managing the Home."

He has also written a book explaining the computer to older children, "The Creative Kids' Guide to Home Computers," and he is planning a book telling consumers how they can be ripped off by computers.

D'Ignazio is a graduate of Nether



(Staff Photo by WALT CHERNOCKAL)

Author Fred D'Ignazio reads from his book to Fred Wellington's first grade class at Swarthmore.

Providence High School. He also graduated from Brown University and Tufts University. He and his wife, and daughter Katie and son Eric, live in Chapel Hill, N.C. His book sells for \$6.95 and is available from the New Leaf Bookstore or Creative Computing Press, Morristown, N.J.

# Author took a trip into Wonderland — and stayed

By LYNN JALUVKA  
Sun Family Scene Editor

CHAPEL HILL — Two of the loves of Fred D'Ignazio's life bumped noses about four years ago, and things in his Chapel Hill home have not been the same since.

In reality, the world of his daughter Catie, then 2, came in contact with her father's world of computers.

She did it through a fantastic journey her father concocted for her — an imaginary trip through the looking glass, the computer screen, and into the works of the instrument.

In the process, D'Ignazio experienced his own personal tumble into the Wonderland of a writer's life. The blend of scientific exploration, fantasy and instruction, it seems, was just what he was looking for.

Since *Katie and the Computer* (the publisher made him change the spelling of the namesake's name) was published in 1979, after a year of brainstorming with Chapel Hill illustrator Stan Gilliam, the 33-year-old author has published six books and contracted to write 18 more.

"CATIE WAS the reason I started this whole thing," D'Ignazio said yesterday in an interview at his home office.

It was on a trip from Pennsylvania, D'Ignazio's home state, that he and his wife Janet came up with the idea.

"My wife asked me, 'How are you going to explain your computer to Catie?'" D'Ignazio recalled.

The idea to write a children's story emerged, and before long, Mrs. D'Ignazio had suggested an *Alice in Wonderland* approach: Let the make-believe Catie lean forward into the computer screen and cross into the world of the computer.

"I thought that was the strangest idea, to have her fall into the computer," D'Ignazio said. "There are all these wires in there. It would be dangerous! She said 'Use your imagination!'"

And he did.

IN THE colorful, hard-cover book, Katie commands her father's home computer to make a flower, then bumps her nose on the glass and falls into Cybernia, the world of the computer.

There she meets the Colonel, the computer counterpart of the white rabbit. The Colonel — a forever charging, sabre-waving man in army boots — tells Katie it is his job to take her order. His real-life equivalent, says D'Ignazio, is the computer program.

Katie's adventure takes her on a swift bobsled ride through snowy, open spaces of the places between the controls and the more densely populated cities of the computer chips. Bits of information — the Bytes — spring to life in the forms of soldiers with letters on their shirt fronts and they all rush, linked together, throughout the world of the computer.

SPEED IS the overriding feeling — "It all happens

in the wink of an eye," D'Ignazio says. Katie and the Colonel take buses and planes and parachute rather than land to deliver the information quickly.

But the book's overall message is one of fun and discovery. The Bytes Katie encounters are friendly characters who hold hands to get the job done and are eager to obey her wishes. Her trip with the Colonel is instructive — however rushed — and adventurous. They even encounter a bug in the program, which materializes (of course!) as a giant razor-toothed monster wielding bubblegum lassos who tries to gum up their progress.

Katie is shot back out of the computer world with the burst of color 'paint' that creates the flower she commanded on the terminal screen. The ending is typical *Alice*: She cries out in pain, having bumped her nose on the glass. Did she just imagine it all, or was it for real?

The paint splatters on her pants are the one clue, "our bow to fantasy," D'Ignazio says.

D'IGNAZIO'S OTHER books — *Creative Kids Guide to Home Computers*, *Small Computers: Their Technology and Future*, *Working Robots*, *Electronic Games*, and *The New Astronomy* — address kids fourth grade and up. Just two days ago, he contracted to write his first adult book, and he hopes to maintain a broad readership base in his work.

"I try not to talk down to anyone, whether it's children or adults," he says.

"I LOVE information. When I was growing up, I said, 'I'm not going to be a writer, I'm going to be an information manager.'"

But if the vibrant illustrations and fantasy are tempered in the books for older kids, the appeal to the imagination is still strong.

D'Ignazio's writing often addresses the reader directly, making him a character in the world of the book. In a series of mysteries he has not yet published, the reader must try to solve the mystery — each one a situation involving the possible assets and problems with having computers in our lives. The answers are in the back.

"I love the mixture of fantasy and reality; I love to teach, especially children. They have such lovely minds. My wife calls my writing 'fiction/non-fiction'."

He writes his books on computer terminals, does his work surrounded by other computer terminals with blipping patterns, to music played by computers.

And, he reflects, his interest in computers probably has a lot to do with his quick success.

"MY WRITING has really taken off," said D'Ignazio. "My interest in computers coincided with society's interest. If I'd picked something less hot, it would have made it much harder to sell."

Projections are that some 3 million home computers will be sold in the United States during 1982. In light of that fact, it seems D'Ignazio is among the vanguard of writers who will ease the transition as computers become part of a child's everyday life.

"Who will benefit most from the new home comput-



## Computer story-telling

Author Fred D'Ignazio demonstrates a home computer that helps his children learn to read. Each image on the screen is a different story.

When a child picks one, the computer guides him through it, matching words with pictures and asking the child to respond to questions.

Sun staff photo by Jim Sparks

ers? You will," he tells his young readers in *Creative Kids Guide to Home Computers*. "Many older people still see computers as giant brains with plans to take over the world."

**HE IS** concerned, the jacket introduction reads, "with introducing the computer to young people as a wonderful tool rather than a forbidding electronic device.

D'Ignazio sees the computer not as a 'giant brain', but as a friend, and robots "even as pets, or assistants. Our images will have to change. Their shape can be anything you want.

"It's going to be a strange world we're going to live in. We're going to have a robot army — the Pentagon is already thinking about it. Of course, we have outerspace robots. We're going to see undersea robots, robots in mines, robots in the home.

"My message to the kids is the excitement of computers, the many faces that computers can wear," he says.

**D'IGNAZIO HAS** had broad schooling, including pre-medical school training, some law school, a master's in international relations and work towards a doctorate in computer science. He quit work towards the degree when his writing consumed all of his energy.

"I am basically schooled out," he said.

He writes full-time, is there to greet the two children, Catie and 3-year-old Eric, when they come home, and is also assistant editor for *Compute!*, a magazine based in Greensboro.

Despite the relative ease with which he and Gilliam published *Katie*, the work has taken a long time to pay off, D'Ignazio says. It was just this year that his efforts began reaping any financial gain.

"As for financial support, it's all been my wife's doing," said the author. His wife, assistant director of the Chapel Hill transportation department, "said it was like starting a small business — you expect to be in the red for awhile," D'Ignazio said.

"This year's been incredible. I'm going to make a living at it this year."



## ***Author, illustrator visit school***

Students at R.N. Harris School had a special visit from illustrator Stan Gilliam and author Fred D'Ignazio yesterday during a story hour which featured their book *Katie and the Computer*. Gilliam, second from left, and D'Ignazio, second from right, read the book aloud for Katina

Carlton, left, Robby Switzer, center, and David Lee Edgerton Jr., right. D'Ignazio of Chapel Hill, and Gilliam of Kannapolis, will be featured at a signing party from 2 to 5 p.m. Saturday at B. Dalton Bookseller in Northgate Mall.

— Sun Staff Photo by Cooper.

the  
SUN

Durham, N.C., Wednesday Afternoon, January 23, 1980

# The BABE invites you to meet his BAMBINO... FRED D'IGNAZIO

autographing his latest book:

## *How to Get Intimate with Your Computer*

Towne House

Friday, Dec. 30

3 until 5 p.m.

Join Babe and Fred for holiday cheese and wine

DELAWARE COUNTY DAILY TIMES Tuesday, December 29, 1983 25

## OPINION AND COMMENTARY

# Getting intimate with your computer

Remember eggheads? Well, they're back in fashion.

So the Friday after Christmas, Babe D'Ignazio is hosting a little get-together at his Towne House restaurant in Media for an egghead he knows very well.

His name is Fred D'Ignazio, who happens to be the Babe's oldest son.

Young D'Ignazio has written a book about computers — his seventh this year — titled "How to Get Intimate With Your Computer."

Babe is a lot of things, as we all know, but mostly he's a proud father. So he jumped at the chance to do something for son Fred, who was featured just recently on "Good Morning, America."

Fred, 34, will be in the Towne House on the eve of New Year's Eve autographing copies of his book from 3 until 5 p.m. Purchasers are expected to come from the ranks of those folks who will receive computers as Christmas presents and are in the dark about their operation. Just plain friends of the Towne House also will make their presence



felt.

In addition to authoring books about computers, Fred is also an editor and columnist for one of the leading computer magazines in the country, "Compute!" Assignments for the magazine take him all over the country and abroad.

"I'm like the Charles Kuralt of high tech," Fred chuckles.

A graduate of Nether Providence High School, Fred's senior English teacher was Lionel Jackson, now retired.

"Mr. Jackson probably played a bigger role in my life than any other teacher — not only because of his talent as an instructor but also for his strength of character," Fred points out.

Fred met his wife-to-be, Janet Lettis, when both were members of the Nether Providence High cast of "My Fair Lady."

The couple's choice as a honeymoon hideaway should have been the tipoff that here was not your basic blanket partnership: Iceland.

Fred attended Brown University, American University Law School, University of North Carolina (for computer science) and his master's is in International Relations from Tufts.

If you see wife Janet as the typical homemaker, happy at the hearth, watching Catie, 8, and Eric, 4, grow older and older, forget it. Janet is general manager of Valley Metro, the outfit which runs the transporta-

tion system in Roanoke, Va., where they live. (She's moving up — she used to run the transit facilities in Chapel Hill, N.C.)

"It's a beautiful deal," Fred admits. "All I need in my job is a wall socket (to plug in his word processor). So if Janet's career calls for a move, I'm ready to go."

The D'Ignazios have 18 computers in their home and their children play with them the way children who don't have an egghead for a father play with blocks and trains.

Until now, Fred's been writing books about computers for children but "How to Get Intimate With Your Computer" is, as you might have guessed, directed at a mature audience.

The publisher is McGraw-Hill, hardly a Mickey Mouse operation.

So, a week from Friday, Pop's going to pull a cork or two. After all, you could say Fred's the Apple of his eye.



Staff photo by WAYNE DEEL

TOPO the robot flanked by D'Ignazio family (from left): Catie, Fred, Janet, Eric

## Life with a machine: Robot worthless as servant, great as 'pet, friend, educator'

By STEVE COOPER  
Staff writer

It won't mow the grass. It won't mop the floors. It won't even fetch the newspaper.

It's TOPO the robot, the latest addition to the robot craze sweeping the country.

For the past week, TOPO, a 3-foot-tall robot that looks like a cross between R2D2 and Frosty the Snowman, has been living with the D'Ignazio family in Southwest Roanoke.

Fred D'Ignazio, computer expert and author of several children's books on computers, invited TOPO to live with his family so he could write about his children's reaction to the robot. The robot is on loan for several months from Data Base, a computer company.

"I want to find out if robots can become part of a family or if they should be left in the closet," D'Ignazio said.

So far, TOPO has been able to disprove two of the more common ideas about robots: that they will make life easier by doing housework, and that they will make life difficult by replacing people at work.

TOPO hasn't done one household chore for the D'Ignazios and probably won't for the remainder of his stay. What TOPO has done is run into walls, get smacked on the head when it gets in the way and provide entertainment for D'Ignazio's two children, Catie and Eric.

Please see **Robot**, Page A-8

## EDUCATION

## Home-teaching trend predicted

Continued from Page 1D.

Kenneth Komoski, an associate professor of education at Teachers College at Columbia University in New York, points out that more educational computer programs are being sold for home use than for school use.

Future Computing, a computer research firm in Richardson, estimates that the amount of educational software sold for home use will grow from \$100 million in 1983 to \$1.1 billion in 1988.

"This technology may in fact eventually end in part in an initial trend of parents educating their children at home," said Komoski, who also is the executive director of the Educational Product Information Exchange, a non-profit institution that reviews educational programs or software.

He said an informal study he has conducted across the country shows that the typical family with a home computer spends \$200 to \$500 on educational software during their first year of ownership.

"One person I interviewed for the program had spent \$100 for the computer and is going to get a rebate on that. They then bought \$300 in software," Komoski said.

The parents bought the computer and programs because their son was behind in math and needed extra drill and practice, he said.

After using the computer at home, the boy's math level quickly rose.

"Parents are really moving ahead with particular kinds of software they have found one place or another. I can see a potentially confrontational atmosphere with parents saying (to school administrators) 'We bought this stuff and our kids are doing fine,'" Komoski said, and then questioning the schools' choice of educational programs.

He said the next step is for parents to decide they are doing as good a job of teaching at home as the teachers are doing in school.

School administrators, however, say that no parent is equipped to teach children in all subject areas.

Mrs. Wilson said she and her husband, Clark, a doctoral candidate at the University of Chicago, decided to pull their students from the Chicago school district for a number of reasons not related to computer use, but that their home computer made it practical.

"We would have pulled them out because we have this strong religious slant, but it would have been more difficult without the computer," Mrs. Wilson said. "Our 5th and 6th graders are doing long division and have to know

"Computers are the new family hearth. Families are spending more time doing that (using a computer) than watching TV or going to a shopping mall."

— Fred D'Ignazio,  
associate editor  
of *Compute*

the multiplication tables. I shudder to think what it would have been like trying to do it with flash cards.

"We would have taken them out anyway, but having the computer available was a deciding factor," she said.

Along with multiplication tables, the children use the computer to drill facts such as the name of states, their state capitals and the names of presidents.

While one child drills on the computer, Mrs. Wilson teaches other subjects such as English composition using traditional methods. The family recently bought a Commodore 64 and is acquiring additional educational software for it. Mrs. Wilson said a lot of the programs are being written by members of a local users' group and are free.

Mrs. Wilson said she and her husband were dissatisfied with the curriculum of the school. She said they were upset because the schools did not stress the memorization of math facts and basic grammar. Wilson also wanted his children to learn Latin, something not offered by the Chicago school district in the elementary grades.

She said the final straw was the strike by Chicago teachers.

Mrs. Wilson said she, her husband and children are happy with the home school now, but they have not yet decided whether the children will attend a regular high school.

A majority of parents may not take their children from school but, Sherwin Steffin, president of Edu-Ware Services, an educational software manufacturer in California, said he agrees that parents will play a larger part in future education.

"The school building is not a very efficient way of doing instruction; you crunch a bunch of kids into a rectangular building and then move them around," said Steffin, a former school teacher who has written extensively about computers and education.

"Computers mean you do not have to have the learner and the instruction in the same place. Home education is certainly going to be a component of the future," he said.

Steffin, Joyce Hakansson, president of an educational software company in Berkeley, Calif., and Fred D'Ignazio, associate editor of *Compute*, a computer magazine, said the trend toward home schools will be limited by several factors, including the other responsibilities of parents.

"This is just what bothers the heck out of me. If we parents take on the whole work load, we're doing too much. I just don't see how this could work with Dad and Mom both working," he said.

Undoubtedly, the computer is bringing families closer together, he said.

"Computers are the new family hearth. Families are spending more time doing that (using a computer) than watching TV or going to a shopping mall," he said.

Ms. Hakansson said schools serve a purpose other than education and could never be wholly replaced by home education.

"I think the schools serve a definite social purpose and it's not altogether education," she said.

Mrs. Wilson said "the social purpose" of the school is one of the reasons she and her husband decided to teach their children at home.

"I don't care for the language I hear on the playground and I don't like some of the interplay I see between the boys and girls when they get up to around the 5th grade," Mrs. Wilson said.

"They (her children) get a lot of socialization here. They are right here so we can oversee what they are doing. I don't feel they are missing any socialization from the public school situation," she said.

Her three children, two girls and a boy, play with 26 other children on the playground of the married students housing at the University of Chicago where they live.

"We know these people. They are good people," she said.

Steffin said that while home education may not be for most families he can envision a system where children spend half a day at home learning core skills taught with the aid of a computer and half a day at a school learning the other things schools teach, "how to react to other kids, how to react to adults, the impor-

ance of being on time, how to deal with authority figures."

Ms. Hakansson and D'Ignazio said they think new types of schools are more likely than home education.

"It is much more practical to think about smaller schools all having different directions," Ms. Hakansson said.

Instead of 12 schools in an area all teaching the same thing, she said she envisions a system of 12 different schools. Or perhaps three each of four different types of schools.

The diversity would be possible because of the extensive use of computers. The variety of software available for the computers will enable the schools to teach more subjects at more levels using more methods.

That kind of a shift to multiple modes of schooling could lead to the beginning of growing numbers of private schools set up to teach children about computer by using computers, said D'Ignazio, who has written several articles about computers and their impact on education.

"I could think of a whole new enterprise of private schools with computer use," D'Ignazio said.

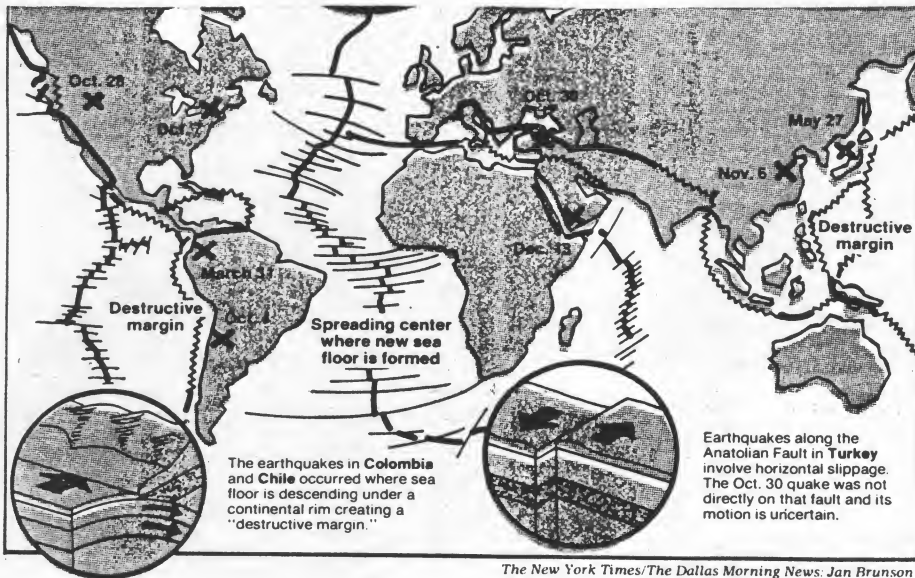
Bob Ranson, president of an educational computer product firm called Chalk Board Inc., said that alternatives to education are becoming very important to him on a personal level.

"I have a 3½-year-old and I'm real concerned about what she's going to do when she gets to school. I can do better teaching my kids at home ... doing it myself because most of the schools don't have computers and if they do they don't have enough," he said.

Still he is reluctant to keep her at home because of the problems of finding time to work with her and the isolation. He is considering taking a halfway step, enrolling her in a private school with an emphasis on computer use, he said.

His company, which manufactures a touch-sensitive pad that replaces a computer keyboard and allows young children to effectively use a computer, was founded because of growing parental dissatisfaction with schools and to provide aids for more effective computer teaching, he said.

"I suggest we face the strong possibility of decreasing quality of education in the next few years. We need an examination of how we teach kids," Ranson said. "I think it's going to be so different 10 years from now. I think there is going to have to be a breaking down if we are going to be competitive."



The New York Times/The Dallas Morning News: Jan Brunson

Earthquakes in one part of the world may trigger tremors elsewhere.

# The quake link

Widely separated tremors may be related, scientists say

By Walter Sullivan  
New York Times News Service

NEW YORK — On Oct. 28 at 8:06 a.m., two small children walking to school in Challis, Idaho, were killed when an earthquake of major intensity showered them with debris from a collapsing building. Two days later, also near sunrise, an earthquake of slightly greater strength killed more than 1,200 people in Turkey.

And last Monday yet another

## SCIENCE

strong earthquake — this time in northeast China — reportedly killed 30 people and knocked down many homes.

Might these events, so widely separated in space but so close together in time, have been related? Can a very powerful earthquake set the stage for another one far away? Or can some other triggering factor be identified that would make

possible advance warnings?

Pressure to find such answers is at a peak because of the recent rash of lethal earthquakes. One in Yemen last December killed an estimated 2,800 and left tens of thousands injured or homeless. In March more than 250 died and many more were injured in Colombia. In May at least 104 died when earthquake-generated waves swamped coastal communities on

Please see **QUAKES** on Page 5D.

## about memory

By Gayle Golden  
Staff Writer of The News

Does spelling disturb your tranquility? (Or is it tranquility?)

Does spelling harrass . . . harras . . . harass you? Do you ever wish you could guarantee that *guarantee* will never be *guaranteee*?

According to Dr. Alan Brown, associate professor of psychology at Southern Methodist University,

## PSYCHOLOGY

people cannot always guarantee they will spell certain words correctly, no matter how many times they learn and relearn the spellings.

"Most people assume spelling is automatic — that once you get it, you've got it," Brown said. "And they assume that people who can't spell are stupid. But that's not necessarily true."

Brown, currently doing research on the subject, believes that some spelling problems may stem from the nature of memory, which he contends may actually cause us to spell certain words incorrectly.

In our memory, he said, we may store several different spellings of the same word, each of which is connected along a similar memory pathway. The word *separate*, for example, may also be represented in the memory as *seperate* or *sepperate*.

"When we try to spell a word, we reach into those pathways for the strongest representation," he said, "which is usually the correct spelling because it is always being reinforced by what we read or write."

But that reinforcement may backfire for certain frequently misspelled words such as *tranquility*, *guarantee*, *beggar*, *medieval*, *vengeance*, *descendant* or a host of others, he said, particularly if we encounter these misspellings often.

The more we see misspelled words, he contends, the more we reinforce our misspelled representations. In some cases, those incorrect representations may compete with a person's memory of the correct spelling.

"Most people's folk wisdom is that if you see a word you'll know it is wrong," Brown said. "But by looking at it you actually make that a more likely candidate."

For the past four years, Brown has tested his theory on more than 500 college students, with spelling quizzes designed to show the effect of misspelled

Please see **STUDIES** on Page 5D.

# Computers move classroom into the dining room

Home-teaching trend predicted

By Karel Holloway  
Staff Writer of The News

Each morning, Pat Wilson clears the breakfast table and sends her children off to school in the dining room.

From 9 a.m. to 3 p.m. the students, her children aged 6, 8 and 10,

## EDUCATION

learn their lessons from their mother and a Texas Instruments 99/4A computer.

The Wilsons are part of what some computer specialists and educators say could be a trend: parents who teach their children at home with a computer instead of sending them to school.

No computer specialists or educators predict that the majority of children will be taught at home in the future, but all those inter-

viewed agreed that home education using computers will be a part of the revolutionary changes in education likely to take place during the next 20 years.

Linus Wright, superintendent of the Dallas Independent School District, said he thinks that parents, fed up with what they perceive as poor school performance, will decide to teach their children at home. But parents really can't have enough background in all the educational areas to teach effectively, he said.

Those writing educational programs for home use say that parents will gain confidence in their ability to teach their children because of the increasing numbers of home computers and the teaching software available for them.

Please see **HOME-TEACHING** on Page 4D.



Linus Wright ... says children are taught more effectively in schools than at home.

Wright: Education belongs in schools

By Karel Holloway  
Staff Writer of The News

Children should get their education in the classroom, not the dining room, Dallas school superintendent Linus Wright says.

Children cannot be taught as effectively at home by parents as they can be taught in school, he said.

"I think the specific problem is that in our public education program every child is taught in 13 content areas. I don't know of any person that is competent in all 13 content areas. It would be the same as a teacher trained in reading trying to teach math or science," Wright said. "The child is bound to suffer."

Children between the ages of 6 and 16 must attend school in Texas unless the parent can show

they will receive an adequate education outside of school, Wright said.

But he agrees with a number of education and computer specialists who believe that growing numbers of parents will decide to provide their children's education.

"There is beginning to establish a trend of parent disgust with public schools and private schools. It could be a dangerous trend," he said.

He said computers are an effective teaching aid for both teachers and parents, but "there is not adequate software available to use it as a total aid for teaching."

But education programs or software for total computer instruction will be available within

Please see **WRIGHT** on Page 4D.

# Patrick Henry students write book on computers

By CHRIS GLADDEN  
Staff writer

The programs some Patrick Henry High School students are putting on TV screens these days are going to put the students in a book.

Writer Fred D'Ignazio is working on a book aimed at helping parents teach their children with and about computers. Hayden Publishing Co. encouraged D'Ignazio to get some young people involved. So D'Ignazio approached the Roanoke school system with the idea of having some students help him with the book.

His groundwork — and the close proximity of his house to Patrick Henry — led

him to the computer science class of David W. James.

James was delighted with the prospect of having some of his students collaborate on a book and the students were pretty happy themselves.

"It's exciting having your first software published," said Howard Boggess, a junior. "In Time (magazine), there's a 16-year-old making a fortune on his software."

These students won't be making a fortune from this book, said D'Ignazio. "They're very underpaid. They'll get a copy of the book and a pizza party."

They also will get individual credit in

the book for the programs they develop and a short autobiographical passage with a little background on each student telling why the student is drawn to computers.

The programs are learning exercises in game format.

D'Ignazio offered guidelines but left it up to the students to develop the program.

Angela Bradshaw worked out an exercise in subtraction based on disappearing ghosts. A number of ghosts pop up on the screen. The second time, fewer pop up on the screen. The youngster has to count the ghosts and enter the answer into the computer.

Beth Ann Hostutler and Joni Burdette

developed an exercise in which a king counts the diamonds in different rooms of his castle. The youngster working the puzzle has to figure out the number of diamonds. The girls designed the diamonds and king. They compare working with computer graphics on a screen to working on graph paper.

Mack McGhee came up with a multiplication exercise using people and hamburgers. Boggess' software involves a division exercise using pizza and people called Pepparoni Please. Howard Levine, a sophomore not taking computer science, helped Boggess and McGhee.



Staff photo  
by JACK GAKING

Second-year students (from left) Beth Ann Hostutler, Joni Burdette and Angela Bradshaw practice at computer terminal

# Computers

From Page S-1

Scott Rainey and Brian Francois came up with a multiple choice exercise; Melissa Perdue developed two exercises.

The book is aimed at Atari computers but D'Ignazio said the exercises will be translated for use with five other major computers. Discs with the exercises on them will be available and the programs will also be printed in the book so computer owners can enter them into their home computers.

The title of the book is "Beyond Video Games — 40 learning games on your

home computer." D'Ignazio calls it "an alternative to TV and a tutorial for the whole family." It's scheduled to come out in paperback this summer in a printing of 40,000.

"The drawings the kids did are the most elaborate in the whole book," D'Ignazio said.

While his peers are feeding quarters to Pacman at a furious rate, Levine would rather "program a computer than play games on one."

"I played video games but now I prefer to play my own," said Boggess.

Other students, such as Miss Hostutler and Miss Burdette, both second year computer students, didn't start playing video games until they took computer classes. Some of the students have home computers.

"I selected some of the more motivated students for the project," said James.

This was obvious on a recent visit to the school. After a full day of classes, several of the students lined up on the school's computer terminals for a challenging "Star Trek" game, zapping the Klingons into oblivion.

# Roanoke convention brings together science fact, fiction

By PAUL DELLINGER  
Southwest bureau

10/18/84

Sure, Lisa Cantrell likes science fiction. She reads it, writes it, and has at least one novel under consideration by a major paperback publisher.

But she's as interested in the science part as the fiction, and keeps busy as a space activist — one of those folks who lobby for more NASA funding and try to show others that science-fact has its sense of wonder, too.

Finally, she found a way to bring the worlds of science fiction and science-fact together, as one of those involved in RoVaCon, the annual Roanoke Valley sci/fi education and nostalgia convention, which will have its ninth gathering Oct. 26-28. This year, it will be at the Roanoke Civic Center and Cantrell is its science coordinator.

Cantrell said she finds herself constantly appalled by the gap between science fact and fiction groups.

"This has been apparent at sci/fi cons where fans can quote 'Trek' scripts line for line, and will debate for days the most trivial part of their favorite sci/fi book, story or film, yet plead lack of knowledge and time to devote to pro-space activities," she said.

"And the science community in general is just as one-track, with its stereotype view of sci/fi fandom — the zap-gun-and-pointed-ears syndrome. I was with a National Space Institute tour as guests of NASA at the fourth shuttle launch, and was surprised at the lack of interest in sci/fi literature by most of the pro-

space people. It just seems to me that these two groups are natural allies.

"So here I am in Madison, N.C., and Roanoke, Va., attempting to do my part to change the way things are."

To be sure, RoVaCon will have all the trimmings of science fiction conventions — George Takei of "Star Trek," sci/fi authors and artists, films, costumes, books and magazines, artwork, workshops, panels and even an original theatrical production called "Day of the Harvest."

But, besides having sci/fi writer Jo Clayton as author guest of honor, it will also have a science guest of honor for the first time — Fred D'Ignazio, associate editor and columnist for *Compute!* magazine, and a contributing editor and columnist in other science journals.

D'Ignazio lives in Roanoke. He is the author of more than 20 books on such topics as computers and robots. He is the commentator on personal computers for ABC-TV's "Good Morning, America," on high-tech consumer issues for CBS radio, and a contributor to National Public Radio's "All Things Considered" — and those represent only a part of his activities.

Another first this year is the awarding of the William Shatner Science Scholarship, which will be presented by D'Ignazio. RoVaCon's educational emphasis had already brought about scholarships in the fields of writing, drama, art and social studies, and the science scholarship is its fifth.

The science-fact side of the

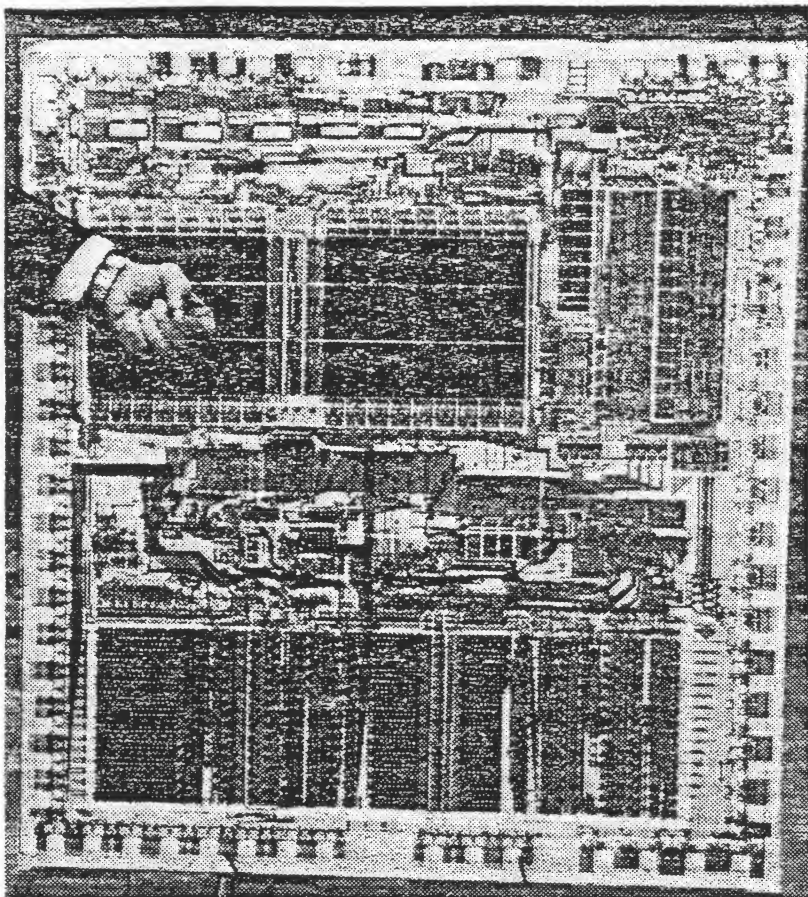
RoVaCon program is not totally new. Richard and Janice Preston not only provided "Star Trek" films but did double duty by bringing NASA and other space program materials with them as well.

Two years ago, RoVaCon expanded its science and space programming. It was a modest start, with two members of the National Space Institute (a pro-space group founded by Wernher von Braun) distributing fliers at a small table and holding impromptu discussions with convention members.

"Last year, we grew into a room of our own featuring displays, brochures, posters and other related data provided by the National Space Institute, the Planetary Society and NASA," Cantrell said.

This year, in addition to the awarding of the scholarship and talks by D'Ignazio in the areas of computers and robotics, RoVaCon has other science activities on its agenda.

"We have two major science panels scheduled, and again the Prestons and members of the Planetary Society will be on hand," she said. Space art also will be on display, with several of the guest artists taking part in the space programming. One of them, Bob Eggleton, will have a slide presentation on "Astronomical Art."



Microprocessor chip held between fingers (upper left) is blown up in large photo in background to show just how much is put onto a chip — thousands of electrical circuits

Staff photos by Wayne Deel

## He says computers are fun

Many people are afraid of computers. Some think they will rule the world someday. But Fred D'Ignazio (pronounced dee-ig-NAZ-e-o) doesn't think so.

He thinks computers can be lots of fun. He says we can learn a lot from them and someday they may even be soft, cuddly toys.

D'Ignazio is a computer expert from Roanoke who has written 20 books about computers. He recently visited Green Valley Elementary School in Roanoke County to talk about these amazing machines.

★ ★

Almost 40 years ago, during World War II, engineers and scientists were trying to figure out a way to hit moving targets with missiles and bullets, D'Ignazio said.

To do this, they needed a way to solve thousands of math and physics (pronounced FIZ-iks) problems quickly. So they began to build a machine that could solve all of these problems — the computer.

The computer they built was huge and weighed thousands of pounds. Controls, wires and tubes were all over the machine. But it could

solve one arithmetic problem a second, D'Ignazio said.

By the time this computer was finished, the war had ended.

Large businesses and universities along with telephone companies began to use these large computers.

"Because computers seemed so smart, people started getting funny ideas about computers," D'Ignazio said.

In the 1950s and 1960s many books and movies were written about computers. Computers were shown as huge, powerful and uncontrollable machines that had a mind of their own. They were pictured as making human beings their slaves.

"No wonder people say that kids today are so much better on computers than adults. Many adults grew up with all these crazy ideas about computers in their heads," he said.

★ ★

In the early 1960s, the United States was developing the space program and wanted to put a man on the moon. Computers were made smaller and lighter so they could fit on the spaceships.

After this was done, scientists continued to try to make computers smaller and smaller. They also made them solve problems faster.

Another problem was that computers were so expensive only the government, big companies or universities could afford them.

The invention of the computer chip changed all that.

The computer chip is a tiny piece of plastic with even smaller wires and circuits in it.

Chips are the "brains" of the new computers in things like watches and cars. They can do a million addition problems a second, D'Ignazio said.

★ ★

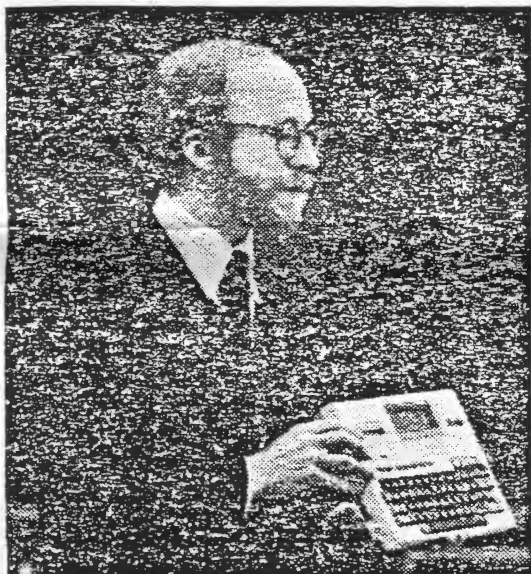
D'Ignazio compared computers to caterpillars. He said computers these days are changing right before our eyes.

"Soon computers won't look the way they do now. Much like the way a caterpillar doesn't look anything like a butterfly," he said.

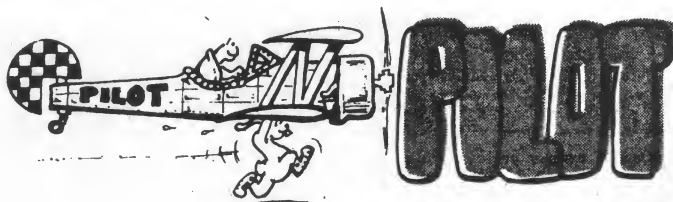
He said computers are turning into totally new and different forms.

"Computers are changing into things we can only guess at now."

—NANCY KELLY



Fred D'Ignazio shows latest small computer to pupils at Green Valley Elementary School



By Fred D'Ignazio  
THE MISSION

You are walking down the street one day, minding your own business. All of a sudden, out of the sky comes a huge snorkle-nosed creature that looks like a giant vacuum cleaner. The creature sticks out its rubbery nose and sucks you into its gut.

The inside of the creature's belly looks and stinks like a smelly gym locker room. Wait a second. This is no creature. It's a spaceship. And it has just kidnapped you to Xandor Doombah, a barbarian planet on the far side of the Andromeda Galaxy.

The spaceship speeds up. It plunges into a black hole. The hole is an intergalactic shortcut. Moments later you and the ship are burped out of a white hole only light seconds from Xandor Doombah.

You taxi in for a landing at the planet's only space port. You are welcomed as a hero. You are the planet's last hope against a group of monsters that is tearing the planet apart.

The planet is being devoured from within by enormous, poisonous blastworms. These giant creatures are bigger than oil tankers. And they are burrowing through the core of the planet, turning its rocky interior into angel food cake. The planet's oracles predict that the planet will burst apart within 1000 Xandorean seconds unless the worms are destroyed.

You are given a blastworm rifle and a bag of food and water, then you are dropped into one of the worm pits. The terrified Xandoreans slam the door shut and barricade it with boulders.

You can't go back. You are in a slimy, smelly maze. You see nothing, only the tiny red glow coming from your rifle's computer.

Somewhere lurking inside are the blastworms. If they catch you, they'll gobble you up.

To escape from the maze you must go through it. Your only chance is to shoot a blastworm the instant it rounds the corner of the maze nearest you. If you shoot too soon, your rifle's "freeze" dart will embed itself harmlessly in a maze wall. If you fire too late, you will end up as a blastworm snack.

### THE PROGRAM

The Blastworm Maze program is written in Atari PILOT. The program is divided into twelve segments. We'll look at the segments, one at a time.

Here's the first segment:

```
40 GR:CLEAR
42 GR:OPEN RED
44 GR:GOTO 79,0
90 C:W=1000
95 U:BEGIN
100 *LOOP1
110 C:W=7*W
115 C:W=7*W
120 C:W=7*W
130 C:W=7*W
```

This segment sets up the graphics screen (line 40), moves your player — the "HERO" — to the far righthand side of the screen (line 82), colors him/her red (line 42), and sets the countdown clock to

### Pilot (Cont. from page 4)

```
947 PA:110
948 SO:10
949 E:
950 *PASS
955 C:W=7*W
960 C:W=7*W
970 SO:11
980 PA:110
990 SO:10
995 E:
```

Here you again see two segments in one: the \*ENTER module and the \*PASS module. The \*ENTER module is called from line 645. The \*PASS module is called from line 745.

The \*ENTER module plays three notes (middle C, E, and G) each time the HERO enters a maze corridor and moves left down the corridor toward a new maze passage.

The \*PASS module plays a random note (between the C below middle C and the B above high C), each time the HERO passes or stops in front of the invisible door.

Now here is the next segment:

```
1000 *CLOCK
1010 C:W=656-1
1020 C:W=656-15
1030 C:W=656-1
1040 T:TIME LEFT = 0
1050 E:
```

1000 (line 90).

Line 95 calls the \*BEGIN module that prints the introductory message on the computer's display screen. Lines 100 to 130 create the numeric variable #M. In #M is stored a random number between 78 and -31. That number is the location of the invisible door into a new passage in the maze. The number must be less than or equal to 78, since 78 is the farthest up the HERO can go on the screen. The number must be greater than or equal to -31, since -31 is the farthest down the HERO can go on the screen.

Now here is segment 2:

```
135 *TRYAGAIN
137 U:W=CLOCK
138 J:W<0:W=NOTIME
140 J:W=0:W=UP
150 J:W=2:W=DOWN
160 J:W=4:W=LEFT
170 J:TRYAGAIN
```

This segment is called \*TRYAGAIN. After each move you make, the program jumps back to this segment. This segment is the program's "boss." It calls on other segments to do all the work.

It calls \*CLOCK (on line 137) to count down the time. It jumps to \*NOTIME (on line 138) if you have run out of time, and you haven't made it through the maze.

It calls \*UP (on line 140), if you are pushing your joystick lever up (towards "TOP"). It calls \*DOWN (on line 150) if you are pushing your joystick lever down. It calls \*LEFT (on line 160) if you have reached a door into a new maze passage, and you are pushing your joystick lever to the left.

And if you aren't pushing the lever at all, or you are pushing it some way other than up, down, or left, (on line 170), it jumps back to the top of the segment and "tries again."

Note that the program checks the joystick lever, using the variable %JO. If %JO = 1, then you are pushing the lever up. If %JO = 2, then you are pushing the lever down. If %JO = 4, then you are pushing the lever to the left.

Now here is segment three:

```
400 *BEGIN
410 T: *** DANGEROUS MISSION! ***
420 PA:150
430 T:
435 C:W=656-0
440 T:
445 T: WELCOME TO THE WORLD
450 PA:150 OF XANDOR DOOMBAH
455 T:
460 T:
465 T: YOU ARE LOST IN A DARK, SLIMY MAZE.
470 PA:150
475 T:
480 T: YOU HAVE ONLY 1000 SECONDS;
485 T: TO FIND YOUR WAY OUT.
490 PA:300
495 T: YOU WILL BE LOST FOREVER.
500 PA:100
505 T:
510 E:
```

This is the \*BEGIN module, called from line 95. The module prints the Blastworm Maze Mission's introductory message on the display screen. The T: command prints the messages. The T: (or T:) command erases the text area of the screen to prepare for a new message. You make the " " symbol by pressing the Esc button, then by holding down the Ctrl button and pressing the Clear button.

The C:@B656=0 command on line 435 positions the message on the first line,

The \*CLOCK module is called on line 137. The clock is a "stopwatch" that keeps time in Xandorean seconds. The clock counts down the seconds, from 1000 to 0, on line 1030. On line 1040, it prints the number of seconds left in the text area of the display screen.

Lines 1010 and 1020 position the "TIME LEFT =" message. Line 1010 positions it in row one; line 1020 positions it in column fifteen (Line 1010 is equivalent to a POKE 656,1 in BASIC; line 1020 is equivalent to a POKE 657,15 in BASIC).

Here is the next segment:

```
1100 *NOTIME
1110 T:
1120 T: *** YOU'RE OUT OF TIME! ***
1130 *NOISE
1140 SO:12
1150 PA:15
1160 SO:14
1170 PA:15
1180 C:W=656-1
1190 J:W<0:W=NOTIME
1200 SO:10
1210 E:
```

The \*NOTIME segment is jumped to from line 138 if the clock variable, #C, has reached zero. This means the Xandorean clock has counted backwards from

## Dangerous Missions

# The Blastworm Maze of Xandor Doombah

(line 0) of the text area of the screen. (If you know PEEKS and POKES in BASIC, what you are doing here is POKEing a 0 into memory position 656. A 0 stands for column zero in the text area of the screen.)

Here is the next segment:

```
500 *UP
510 J:W<78:W=TRYAGAIN
520 GR:TURNTO 0
525 U:W=BLUE
530 GR:DRAW 1
532 U:W=HERO
535 J:W<40:W=DOOR
540 J:TRYAGAIN
550 *DOWN
560 J:W<-31:W=TRYAGAIN
570 GR:TURNTO 180
575 U:W=BLUE
580 GR:DRAW 1
582 U:W=HERO
585 J:W<-40:W=DOOR
590 J:TRYAGAIN
```

There are actually two segments in one. The first, \*UP, moves your player — HERO — up the screen when you push the joystick lever up. The second, \*DOWN, moves HERO down the screen. As HERO moves he/she leaves a glowing blue trail. The maze bottom is phosphorescent. The slightest amount of pressure makes it glow. You can tell where HERO is by the soft red glow on the blastworm rifle's computer.

Lines 510 and 560 check to see if the HERO is at the edge of the current passage in the maze. If so, the program sends the HERO back to \*TRYAGAIN. Beyond is solid rock. The HERO can go no farther.

Lines 525 and 575 call the \*BLUE module to make the cave floor glow blue where the HERO has just stepped.

Lines 532 and 582 call the \*HERO module to print the current location of the HERO in the maze. This is important information, since it will help the HERO keep track of how far away he or she is from the invisible maze door.

Lines 535 and 585 call the \*DOOR module if the HERO is walking by the invisible door. The \*DOOR module makes the door glow bright yellow as the HERO passes it.

Note the two variables, %X and %Y. The %X variable stores the HERO's X-location (the horizontal location, between -79 and +79. The %Y variable stores the HERO's Y-location (the vertical location, between -31 and +47).

Now, here is the next segment:

```
600 *LEFT
610 J:W<-79:W=EXIT
620 J:W<-40:W=TRYAGAIN
630 GR:TURNTO 270
635 C:W=7*W
637 C:W=7*W:W=7*W:W=7*W
640 GR:OPEN BLUE
645 GR:DRAW 0
650 GR:OPEN RED
655 *ENTER
660 T:
665 J:W=LOOP1
```

The \*LEFT segment makes the HERO go down a corridor into the next maze passage. But the HERO can only go down the corridor if he or she is standing right in front of the maze door.

The segment checks to see if the HERO has made it out of the maze (on line 610). It checks to see if the HERO is standing in front of the invisible door (on line 620). If not, the HERO is sent back to "try again."

Line 635 determines the length of the

1000 to 0, and the HERO is out of time.

The segment prints a message — \*\*\* YOU'RE OUT OF TIME \*\*\* — on the display screen, then plays two discordant notes (C# and D#) over and over, six times. This is like getting the "raspberry" or "Bronx Cheer."

Line 1200 turns off the sound. The E: command on line 1300 ends the program.

Now, here is the last segment:

```
2000 *EXIT
2005 T:
2010 T: *** HURRAY! YOU MADE IT! ***
2015 *HAPPY
2020 U:W=ENTER
2030 C:W=656-1
2040 J:W<78:W=HAPPY
2050 E:
```

The \*EXIT segment is jumped to from line 610. The computer jumps to \*EXIT if %X (the X-position of the HERO) is less than or equal to -79, the far lefthand edge of the display screen.

This means the HERO has made it through the entire Blastworm Maze. The HERO has beaten all the Blastworms. The HERO has won!

The computer prints the message \*\*\* HOORAY! YOU MADE IT! \*\*\* then

corridor connecting the old maze passage and the new maze passage. The corridor length is a random number between 0 and 32. A long corridor is good for the hero because a corridor is like a sliding board, and the HERO whisks down it in an instant. A long corridor helps the HERO make swift progress through the maze.

A short corridor is a real setback. And sometimes the corridor is of zero length (the random number chosen by the computer is 0). That means the HERO has been tricked. The invisible door leads nowhere. Behind it is a stone wall. The HERO has to stay in the same maze passage and look for a new door.

Line 637 is there in case line 635 comes up with a corridor that will carry the HERO right off the left edge of the display screen.

On line 645 the \*ENTER Module is called. The \*ENTER module plays three musical notes (C, E, and G) to signify that the HERO is making progress.

At the end of this segment (line 650), the program jumps back to \*LOOP1 to calculate the location of the invisible door in the new maze passage.

Now, here is a new segment:

```
655 *BLUE
660 GR:W=0:GOTO XX,ZY-1
661 GR:W=100:GOTO XX,ZY+1
662 GR:OPEN RED
663 GR:DRAW 1
665 GR:OPEN BLUE
666 E:
```

The \*BLUE module, on lines 660 and 661, sends the graphics turtle back one step and paints the maze red. This shows the HERO's location in the current maze passage.

Note the use of the %A variable. The %A variable holds THETA, the angle, or direction, in which the graphics turtle is going. THETA (%A) can be anywhere from 0 (north, or Up) to 360 (North, or UP). When %A = 0, the HERO is going up the maze passage. When %A = 270, the HERO is going left down a corridor to a new maze passage.

Now look at this segment:

```
700 *DOOR
705 C:W=656-0
706 T:DOOR = 0
710 GR:W=0:GOTO XX,ZY-1
720 GR:W=100:GOTO XX,ZY+1
730 GR:OPEN YELLOW
740 GR:DRAW 1
745 U:W=PASS
750 GR:OPEN BLUE
760 E:
```

The \*DOOR module is called on lines 535 and 585. It prints the vertical location of the invisible maze door. It makes the door glow yellow as the HERO passes. And it plays a random note, by calling the \*PASS module.

Here is the next segment:

```
800 *HERO
825 T:
830 T:HERO = ZY
840 E:
```

This is the \*HERO module. It prints the HERO's Y-location (vertical position) in the current maze passage.

Here is the next segment:

```
900 *ENTER
910 SO:13
920 PA:110
930 SO:17
940 PA:110
945 SO:20
```

(Cont. on p. 5)

plays the \*ENTER segment's three notes (C, E, G) three different times. This is like a triumphant blast from the HERO's trumpet. HURRAY! HURRAY! HURRAY!

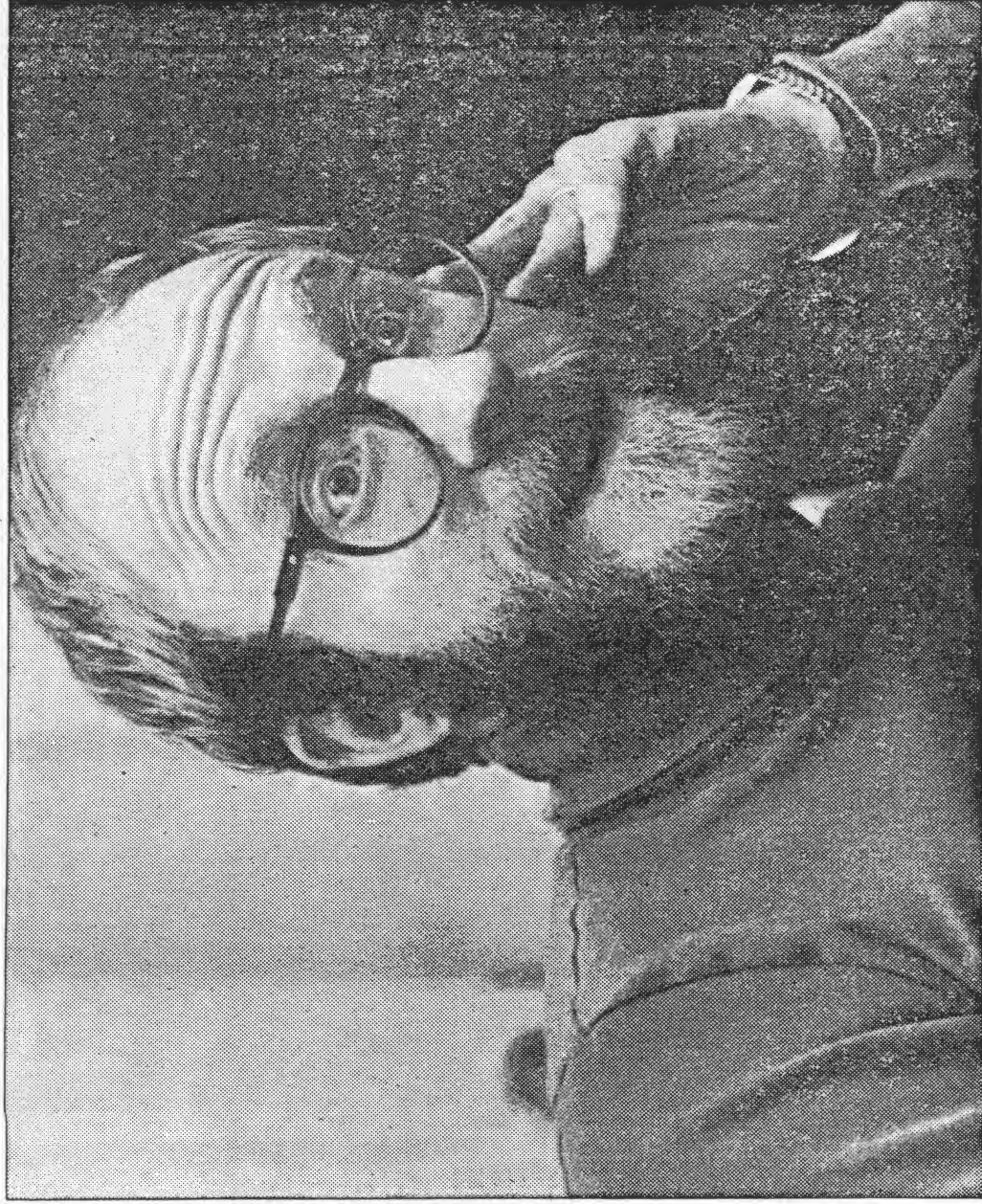
On line 2052, the program ends.

But Where are the Blastworms?

Have you noticed that something is missing? Right. The monstrous blastworms.

Unfortunately, I couldn't fit the blastworms into the program this month. They were too big. That is, the PILOT code to create them was too big. If I had included the blastworm code, this article would have been twice as long. It wouldn't have fit in the Turtle News.

Next month I'll show you the blastworms. That means you have a month's headstart. Practice crawling through the empty Blastworm Maze as fast as you can. See if you can make it through the maze in fewer than 1000 Xandorean seconds. It's tougher than you think!



Staff photo by DON PETERSEN

**Fred D'Ignazio:** 'The way I write is with awe and bewilderment, which is the way I go through life.'

## Career booming for computer man

By CHRIS GLADDEN

Staff writer

To paraphrase "Dr. Strangelove's" title, can man learn to stop worrying and love the computer?

Computer writer Fred D'Ignazio of Roanoke thinks so.

D'Ignazio's newest book is "How to Get Intimate with Your Computer — A Ten-Step Program for Relieving Computer Anxiety."

It's just one of several new career turns that are keeping D'Ignazio busy these days.

They include a regular monthly spot on ABC's "Good Morning America," a monthly column on CBS Radio, the associate editorship of Compute Publications, which has a circulation of more than one million, some regular spots on public TV stations that will be broadcast throughout the country, an upcoming appearance on "The Phil Donahue Show," 20 books in print, and more.

It's clear that success hasn't spoiled Fred D'Ignazio. He, his wife, Janet, and children, Katie and Eric, still live in a comfortable but unpretentious house on Carter Road in Southwest Roanoke. He still drives the same station wagon with the "I Brake for Unicorns" bumper sticker. And he still has the same unbridled enthusiasm for computers and their potential for making life easier and more fun for people.

"The way I write is with awe and bewilderment, which is the way I go through life," D'Ignazio says.

D'Ignazio considers himself a journalist and a thinker and his monthly columns in the publications and on radio deal with how man can use and enjoy "intelligent appliances" — in other words computers and robots.

He calls himself an electronic Charles Kuralt and writes a column for Compute Publications (now owned by ABC) titled "On the Road with Fred D'Ignazio."

It was one of those columns that attracted the attention of toy manufacturers.

D'Ignazio's son has a robot — a small little guy — that became his Teddy Bear. Trouble was, the robot, named Denby, was all hard angles and was not too comfortable to sleep with.

D'Ignazio wrote a column about the possibility of soft, cuddly robots. Ideal, Hasbro, Atari and Tomy all contacted him. Now he's a consultant for them on pet robots. He envisions animal suits for the little electronic guys and chips that will allow the owner to change the nature of the beast. If you want a dog, put in the dog program and put on the dog suit. Likewise with a cat.

No mess, no fuss and no violation of building ordinances.

The ultimate purpose would be educational, though, says D'Ignazio.

To him, computers and robots offer limitless potential for child education — and he's not talking about surrogate teachers from the world of Big Brother.

# D'Ignazio

---

From Page C-1

D'Ignazio uses such terms as the electronic sandbox. Son Eric and daughter Catie play with computers and learn logic, number skills and more without realizing it. They have fun.

The other day, D'Ignazio had 19 computers in his house. Eric sits in the floor so he can play with it on the same level as his other toys.

Robots also come and go. D'Ignazio calls their home a flop house for robots. They come and "visit," D'Ignazio writes about them and they go on to trade shows, other writers or back to the manufacturers.

D'Ignazio, like his children, has fun with the machines and he becomes miffed at manufacturers who try to make computers seem more difficult to use than they are.

He's both a computer advocate and a consumer advocate.

"My mission is to make the way

people use these things as clear as possible," D'Ignazio says. "The whole point of computers is to make something you do more enjoyable. It's not necessary to know how computers work but how to work computers."

D'Ignazio's success has not been overnight though he says his career has changed dramatically and that he's making "a lot of money."

Ten years ago he was working at the Pentagon in what he thought was an important job — a position of power. One day, he found out by accident that he was shipping socks and underwear overseas.

"I thought 'Is this what life is really all about?'"

Soon after that self-questioning, he walked into a Washington elementary school and offered to teach children about computers. The offer was accepted and he's been interested in computers and young people ever since. Two of his books are dedicated to a team of pro-

grammers from Patrick Henry High School that developed some programs for the book and D'Ignazio is continuing to work with them.

As for "Intimate," United Press International is serializing it and also running an interview with D'Ignazio. Sometime in March, he'll be flying to Chicago for the Donahue show and he's speaking all over the country. He says he's in Roanoke now three days a week and traveling the rest of the time.

His status as a celebrity has left his children singularly unimpressed.

When he passes a bookstore that handles his books he becomes excited while Catie brings him back to Earth with a blase "So?"

But D'Ignazio hasn't gotten over the excitement of his blossoming career.

"The only experience I can compare to TV is when Eric and Catie were born," he says. "Equal parts of being thrilled and scared to death."

North Carolina-based freelance writer, speaker, and storyteller. Computer analyst and consultant. Former assistant editor of a national science & technology magazine. Founded a 13-community Bicentennial civic renewal and town-planning project funded by the National Science Foundation.

PUBLISHED BOOKS

Small Computers: Exploring Their Technology and Future (Ages 12 and up; 146 pages; Franklin Watts, 1981).

D'Ignazio exhibits boundless enthusiasm in his rapid rundown on small computers of the present and future ... Provocative fodder for a growing junior high and high school-age audience.

-- ALA BOOKLIST (5/15/81)

I was startled several times to learn how soon in the future some of the computer achievements may come ... I had not any real idea of where we were going, or how fast, in graphics and in music--to name only two of the items discussed in the book.

-- HORNBOOK (8/81)

The Creative Kid's Guide to Home Computers: Super Games and Projects to Do with Your Home Computer (Ages 12 and up; 130 pages; Doubleday, 1981; First printing sold out in two months).

... an interesting and imaginative set of open-ended suggestions for the uses to which these machines can be put by people aware of the powers and limitations of computers ... worth having.

-- HORNBOOK (8/81)

The section on robots is fascinating, and the one on games is very good ... a good overview of some stimulating project ideas ... could be very valuable in home, schoolroom or library ...

-- RECREATIONAL COMPUTING (Jul/Aug '81)

Katie and the Computer (Full-Color Picturebook; 44 pages; Creative Computing, 1979; Illustrated by Stan Gilliam; Book is in second printing).

Lively cartoon characters guide readers through the inner chambers of the computer.

-- SCHOOL LIBRARY JOURNAL (5/80)

The simplest introduction, one that kids will love ... It explains how computers work clearly and simply, and even adults will feel computers are much less threatening after glancing through this book.

-- HOME COMPUTERS ("Buyer's Guide")

A wonderful introduction to computing for those too young to program.

-- CREATIVE PUBLICATIONS (1981)

... both an exciting story that a child will want to read and a simple explanation of computers.

-- RECREATIONAL COMPUTING (Jan/Feb '81)



Catie D'Ignazio, who transforms into "Katie" in "Katie and the Computer."

## Computers for kids . . . without tears

By BILL KENT  
For the Courier-Post

Ever wonder about what goes on behind a mirror? Lewis Carroll told us when he sent Alice through the looking glass. Author Fred D'Ignazio of Media, Pa., found his daughter Catie playing with his home computer one day. His wife Janet was watching on sidelines and said, "I wonder what would happen if Catie fell into your computer?"

So Fred decided to take his daughter on a fantasy trip through the widgets and wadgets of the thinking machine. The result is the book "Katie and the Computer," an illustrated educational fantasy for kids under 5 that gives them an introduction to a device that

will be more and more important in their lives. (\$6.95, Creative Computing Press, Morristown, N.J.)

The story begins when Katie watches her father type "parrot" on the console, and a the screen lights up with a full-color parrot. When Dad isn't looking, Katie leans forward to type in "flower," and magically falls through the screen.

In the course of her adventures, she meets a variety of whimsical characters and encounters the most common villain of all computer systems: a Bug. Fortunately the Bug is debugged, and Katie wakes up from her dream with a daffodil opening on the screen.

Fred D'Ignazio is a computer programmer/analyst and

waiting on a Ph.D. from the University of North Carolina. He credits his daughter with more than the inspiration for the book, and took her to an autograph party at a Media bookstore recently, where she showed off her computer skills and played hostess at the children's party.

Fred plans to write a series of "Katie" books that will not only explain complex computer functions to children, but also give them an introduction to computer logic. Daughter Catie will be his critic and editor.

# Young Authors

at Home  
on the  
Web



**At our summer camp, as soon as our students learned a skill, they passed it on to other students, who, in turn, taught others.**

**T**he world is a multimedia, multi-sensory environment, filled with beautiful pictures, smells, sounds, tastes and textures. In the past as students explored this world, their "publishing" efforts were limited to the teacher's folder or the refrigerator in their family's kitchen. Today, the Internet offers a virtual multimedia environment, which, when coupled with multimedia authoring tools, offers an opportunity for students to conduct research and share it via home pages with other students all over the world. The Internet vastly extends the audience for student multimedia publishing (see Figures 1-2).

#### **EYEWITNESS RESEARCH**

While students love to do research on the computer, computer-based research should not entirely replace real-world eyewitness research. Plants, animals, scenery, and other people in the community can be a source of rich images, sounds, and stories for students to collect and paste into their reports using a multimedia authoring tool. Students can also create audio links on their home pages that play back small voice files, documenting observations they have made. Or, they can create audio captions that accompany written text or pictures in their report. To tie together all

their multimedia research, there are a variety of home page authoring programs on the market for K-12 use, including Adobe PageMill, Claris Home Page, Microsoft FrontPage, Webster from Washington Computer Services, and Sunburst Web Workshop.

This article is based on two years of training students and teachers to create home pages on the World Wide Web and on an intense summer camp on Web page authoring, conducted at Okemos High School in central Michigan. In the summer camp, we used Claris Home Page on Macintosh and IBM computers as our primary authoring tool. Our students ranged from 3rd graders through college students. The students' work is on display at <http://www.tcimet.net/mmclass/summer/CHPTales.htm>.

#### **"EACH ONE, TEACH ONE"**

At our summer camp, as soon as our students learned a skill, they passed it on to other students, who, in turn, taught others. The "each one, teach one" philosophy can be implemented to expand new skills quickly among your students. Using this model for a recent home page project, we broke our multimedia tasks into areas of expertise. Each student became our "resident expert" regarding one topic. Their knowledge grew out of

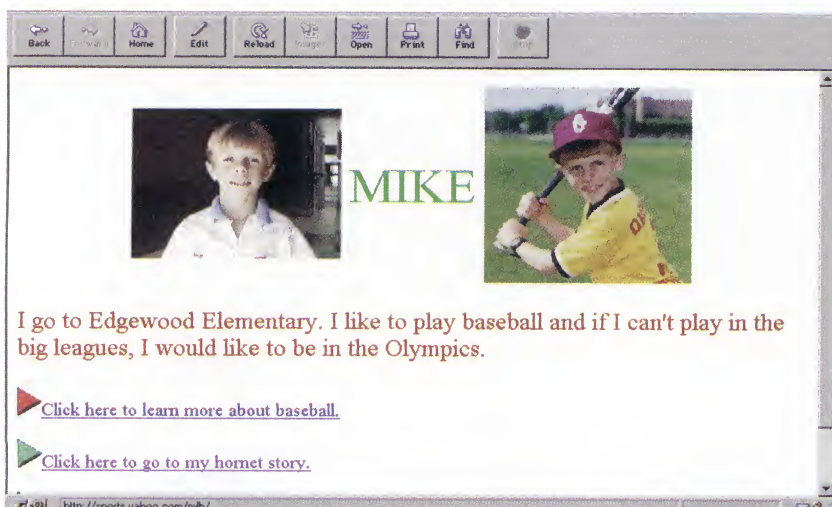
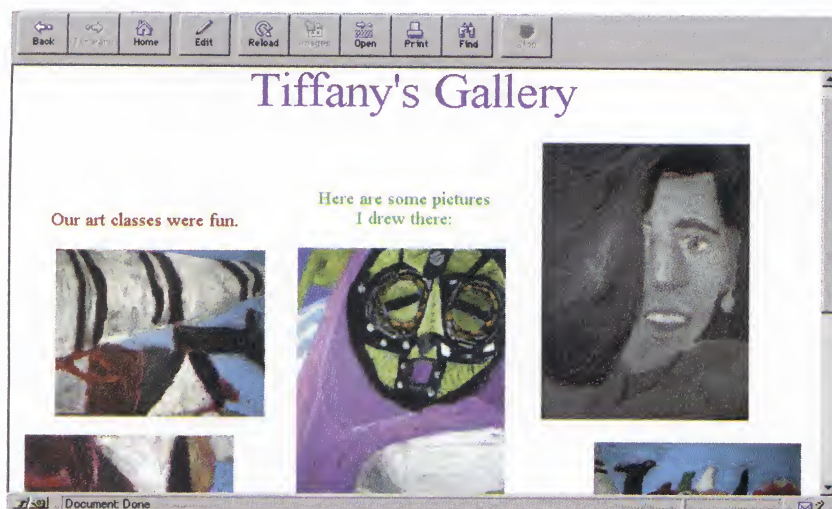
their interest in the hardware, which would help them display their talents on the Web. Thus, our crew divided along the following lines:

- ◆ Sound Recording Expert
- ◆ Scanner Expert
- ◆ Graphic Artist
- ◆ Photo Reader Expert
- ◆ File Format Magician
- ◆ Digital Photographer
- ◆ Quick Cam Expert
- ◆ Internet Link Explorer
- ◆ File Transfer Technician



**Never underestimate  
student ingenuity.**

## Figures 1 & 2



*Web publishing expands children's opportunity for self-expression, well beyond the refrigerator door!*

These students received on-the-job training with quick, one-to-one bursts between teacher and student, and they loved the recognition they received as an "expert" in their field. Once trained, their names were added to the classroom "experts poster" advertising their skills, and their knowledge helped them train the next student who was ready to add that special feature to his or her own home page.

Your own group can be divided according to the multimedia tools you have on hand. This list needn't be all-

inclusive. If you have a laserdisc player, an interface box between TV and computer, or any other multimedia tool, invent a new "expert." Never underestimate student ingenuity. Our sound technician had a single microphone on a computer and a boom box. Sounds were made and recorded using human voice, musical instruments, and classroom objects. Testing to locate an object which would make just the right sound, recording it, cropping the portion needed, and overlaying sound files were all part of the process.

## Showcasing Skills

Students made frequent presentations to the entire class, demonstrating new skills they had acquired. As comfort levels increased, some were asked to make group presentations. These consisted of "how-to" demonstrations, with student presenters repeating the steps they had used to create their own home pages. Even the youngest members of our crew felt confident showcasing their skills. A case in point was our sound technician, an active 3rd grader who got up in front of the room, demonstrated his home page on a large-screen TV, and lectured to a room full of adults. It was impressive watching high school students and a college student take notes!

This shared respect was typical of the experience we had with home page authoring. It enabled students of all grades to create attractive work, which generated a lot of pride of authorship and respect among fellow authors. It was remarkable to have this professional air in a room in which the grades and ages of the students varied so widely.

A quick student/teacher show-and-tell during the latter part of each work session was a great way for us to tap into progress and make suggestions for the next session. Conference notes such as those used in other curricular areas help teachers to communicate. A simple multimedia form highlighting the areas of next concentration or a simple "See me next session for a great idea" opens dialog about the project and shares your enthusiasm.

**This shared respect was typical of the experience we had with home page authoring.**

## MULTIMEDIA DETECTIVES

Teachers can organize their students into research teams of "multimedia detectives." Students play the role of detectives in curriculum content areas and in troubleshooting technology tools. The detectives can sign a contract like the sample contract shown in the adjacent sidebar.

### Assembling Materials

You will need a multimedia computer, an authoring program such as Claris Home Page, an Internet connection, blank tapes and diskettes, assorted cables and adapters, etc. With this basic equipment, once your students have been organized into detective teams, you can get them to become "scavengers" and look for additional key items which will form part of your "R-A-P" center, a multimedia **R**esearch, **A**uthoring, and **P**ublishing center for creating Internet home pages. Video cameras, tape recorders, pocket cameras, and other low-cost consumer electronic products found around any home or classroom can be repurposed into research tools, which students can use to create original images and sounds for their home pages. See the sidebar on page 27 for a listing of typical hardware and software tools that you might consider if you could outfit your center without regard to cost. For a complete "R-A-P" checklist, consult our Web site at <http://www.ticmet.net/mmclass/course/toc.htm>. Here you will find a number of lists of additional resources that will be helpful to you. We give you permission to reproduce everything you find on this site.

### Web Page Authoring

We chose to use Claris Home Page for our summer camp for two reasons. It runs on practically all Macintosh computers and on PC computers running Windows 95. It is a simple program that resembles a word processor. Students can quickly create a home page

## Sample Student Contract

### STUDENT DETECTIVE TEAMS

I \_\_\_\_\_ (name) will work with my fellow students to help my teacher:

1. Scout out, locate, and assemble new technology tools for use in classroom research, authoring, and publishing.
2. Manage and operate all equipment safely, fairly, and politely.
3. Troubleshoot, solve problems, and figure out how to use our equipment for research, authoring, and publishing.

I will share responsibility with other students for conducting demonstrations and tutorials which help others learn to do useful tasks with the equipment.

I will divide my time equally between learning the new technologies for myself and sharing what I know with others, including classmates, teachers, and parents.

I understand that my teacher can't figure out new technology alone. My teacher needs the help of every student in the class to:

1. Scout out the best technology
2. Bring it into the room
3. Set it up and make it work
4. Teach others how it works
5. Manage projects so everyone in the room (including the teacher!) gets experience working with the technology to do research and publishing.

As a result, I understand that if students do not cooperate and help our teacher with technology, then he/she will be forced to minimize the use of technology in our classroom (just to keep on schedule and remain sane).

As a technology helper and coach, I will try to remember what it feels like to be a new learner in an unfamiliar area. I will be polite and use kind words to encourage others to take their first steps into technology. And I will try to keep on schedule in all my personal projects and team projects.

Last, I will remember that my grade is less dependent on my being a technical whiz kid and more on my being a good teacher, friend, and helper.

Student's Signature

Date

Teacher's Signature

(Please get your students to take the contract home and have their parents co-sign it.)

## Tools for Creating Multimedia Web Pages

### AUTHORING SOFTWARE

#### Claris Home Page

Claris, Inc.  
5201 Patrick Henry Drive  
Santa Clara, CA 95052-8168  
800/356-6657;  
<http://www.claris.com>  
(Mac/Win95)

#### Adobe PageMill

Adobe Systems  
P.O. Box 1034  
Buffalo, NY 14240-1034  
800/411-8657;  
<http://www.adobe.com>  
(Mac/Windows)

#### FrontPage

Microsoft Corporation  
1 Microsoft Way  
Redmond, WA 98052  
800/426-9400;  
<http://www.microsoft.com/>  
(Mac/Windows)

#### Webster

Washington Computer Services  
2601 North Shore Road  
Bellingham, WA 98226  
360/734-8248;  
<http://www.nas.com/~larryk>  
(Windows only)

#### Web Workshop

Sunburst Communications, Inc.  
101 Castleton Street  
Pleasantville, NY 10570-3498  
800/321-7511;  
<http://www.nysunburst.com/>  
(Mac/Windows)

### VIDEO CAPTURE

#### VideoVision

Radius Inc.  
215 Moffett Park Drive  
Sunnyvale, CA 94089-1374  
408/541-6100;  
<http://www.radius.com/>  
(Mac only)

#### LPT Video

Digital Vision Inc.  
270 Bridge St.  
Dedham, MA 02026  
800/346-0090;  
<http://www.digvis.com/>  
(PC only)

#### Snappy

Play, Inc.  
2890 Kilgore Road  
Rancho Cordova, CA 95670  
916/851-0800;  
<http://www.play.com/>  
(PC only)

### DIGITAL CAMERAS

#### QV-10A

Casio, Inc.  
570 Mt. Pleasant Avenue  
Dover, NJ 07801  
800-962-2746;  
<http://www.casio-usa.com/>  
(Mac/PC)

#### QuickCam

Connectix  
2600 Campus Drive  
San Mateo, CA 94403  
800/950-5880;  
<http://www.connectix.com/>  
(Mac/PC)

### PHOTO SCANNER

#### EZPhoto

Storm Software  
1861 Landings Drive  
Mountain View, CA 94043  
800/275-5734;  
<http://www.stormsoft.com/>  
(Mac/PC)

### PORTABLE DISK STORAGE

#### Zip Drive

Iomega Corp.  
1821 West 4000 South  
Roy, UT 84067  
800/697-8833;  
<http://www.iomega.com/>  
(Mac/PC)

### VIDEO PUBLISH/PROJECTION

#### TelevEyes

Digital Vision  
270 Bridge St.  
Dedham, MA 02026  
Dedham, MA 02026  
800/346-0090;  
<http://www.digvis.com/>  
(Mac/PC to TV or VCR)

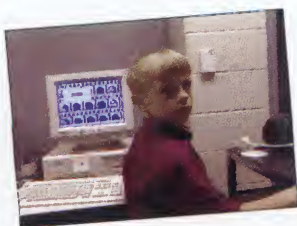
either by copying and pasting text created in their classroom word processor or by typing text directly into Claris Home Page. They never see any messy computer code. Their home pages look approximately the same as what they will look like when loaded on an Internet server.

## Students can publish their home pages on a school's protected Intranet.

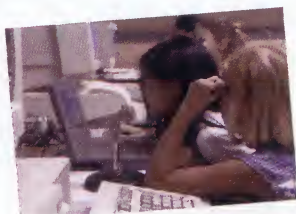
For example, when your students save their "word processing" file they are automatically saved in HTML (HyperText Mark-up Language) format, which is readable by any Web browser (including Netscape Navigator and Microsoft Internet Explorer). You and your students can also use Claris Home Page to open any existing HTML page and edit it or modify it. Almost all the activities you do to create a home page appear as buttons in a menu at the top of a Claris Home Page screen. For example, you can add "links," which will lead you to another home page. You can add links that will lead to another type of a file, such as a sound or movie clip. You can insert images and tables, and of course, you can edit all of the above. Now student research can be expanded far beyond simple words on paper.

### A Secure Environment

For teachers who are worried about students being at risk if they publish on the Internet, there is an alternative. Students can publish their home pages on a school's protected Intranet—a secure, wide-area network, which spans the school buildings in a district, or a local-area network right inside a single school. Even more protection is offered if the students publish only in their own classroom and their home pages are stored on the classroom computer's



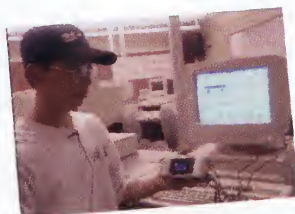
Mike, a 3rd grader, prepares to author a Web page using Claris Home Page.



As soon as our students learned a skill, they passed it on to other students, who, in turn, taught others.



In this picture Jennifer, a middle-school student, demonstrates the Quick Cam "eyeball" camera, which records still images and short digital movies.



Kevin, our high school student, tutors a fellow student in how to use the Casio QV-10A digital camera.



Students made frequent presentations to the entire class, demonstrating new skills they had acquired using hardware and software.

hard drive. Or, for the greatest security, students can save their home pages only on their own private student diskette or zip disk.

This form of protected publishing doesn't compromise students in the least. Students can demonstrate their work in front of others, even if their home page resides on a single floppy disk. They can print their work to turn in to the teacher or to share at home with their parents. They can even copy their files to other students' disks and share home pages the way past generations of students traded baseball cards.

## TEACHING IN A MULTIMEDIA WORLD

As our multimedia world expands on the Internet, the teacher's role must become that of guide on-the-side, not sage on-the-stage. An individual teacher—or even a team of teachers—can no longer encapsulate a subject area to be studied and direct the students through the information at hand. Up-to-the-minute information in all subjects is the emerging standard for classroom learning. As educators, our emphasis must be to place the vehicles to seek out current knowledge within easy reach of our students. Preparing your class to author home pages on the Web will capture your students' curiosity and propel them into this new multimedia world.

**Fred D'Ignazio** is the author of 25 science and technology books for children. Fred's most recent project is a CD-ROM entitled M.U.D. Pie—Multimedia U Design, It's As Easy As Pie, which helps classrooms begin publishing home pages on the Internet. **Joanne Davis** has 24 years experience teaching elementary and middle school. Communications to the authors should be addressed to Fred D'Ignazio, President, Multi-Media Classrooms, Inc. 1773 Walnut Heights Drive, East Lansing, MI 48823-2945; 517/332-8896; e-mail: [dignazio@msen.com](mailto:dignazio@msen.com); Joanne Davis, Elementary Computer Coordinator, Okemos Public Schools, 4406 N. Okemos Road, Okemos, MI 48864; 517/349-2093 x2080; e-mail: [jdavis@okemos.k12.mi.us](mailto:jdavis@okemos.k12.mi.us) ✉



Student musicians can create original music and sound effects for home pages using a simple microphone and sound card.



A new generation of small "tiny-tech" research tools lets students play the role of detectives and do eyewitness investigations in the form of news clips, interviews, oral testimonies, photojournalism, etc.

# Multimedia Detectives: Exploring the World Wide Web at High Speed Using Cable TV

*Fourth- and fifth-grade students and teachers at Murphy Elementary in Haslett, Michigan, are not in the classroom today. They are wearing rubber boots and trying their best to tiptoe around in a bog near the school. Their aim: to investigate the fragile wetlands that abound in Meridian Township but that are increasingly at risk due to the rapid commercial and residential development in their area.*

Unlike most students who travel light when they explore, these students are laden with notebooks, pens, pencils, a tape recorder, a video recorder, and a pocket camera. They are "multimedia detectives," part of an ongoing program in Okemos, Haslett, and East Lansing schools. The program, now almost two years old, enables teachers in the three school districts to explore the ways that multimedia and telecommunications technology can help their students engage in "authentic" publishing.

For the last two years I have been working on the Multi-Media Detectives Project as a consultant, author, and instructor on behalf of my company, Multi-Media Classrooms, Inc. Among our project's many program sponsors is the Michigan Information Technology Network (MITN), and we use MITN's computer server to maintain our own web page on the World Wide Web on the Internet, which can be accessed at <http://www.mitn.msu.edu/mmd.htm>.

The teachers in our project and their fourth- and fifth-grade "detectives" plan to gradually develop the home

page into an online multimedia gallery featuring their science research on local wetlands in Meridian Township. Teachers would also like to see their students' web pages feature hypertext and media links to wetlands resources pulled from remote libraries, laboratories, and other research locations around the globe.

## Connecting the Web to Two-Way Cable

To help the students become more competent as web explorers we have begun using two-way cable TV as a control and viewing mechanism. The two-way cable connection is possible due to the sponsorship of TCI Cable of Mid-Michigan. TCI has set up two-way links in elementary school classrooms in each of the three participating school districts. A fourth two-way link has been set up in my Multi-Media Classrooms interactive-TV studio in Okemos.

TCI Cable and Michigan State University have installed a high-speed cable modem at the Multi-Media Classrooms site. This modem, made by Digital Equipment Corporation and known as "ChannelWorks," is the size of a small VCR. The ChannelWorks box is attached to an IBM PC via an internal LANtastic Ethernet card and a standard Ethernet cable. A second connection on the back of the box is then attached to normal coaxial cable just like the connection on the back of a TV or VCR. Thanks to an online gateway provided by MSU, our project's PC is now on a high-speed network that allows us to send and receive data over the Internet via a full TCP/IP connec-

---

**Students can see the World Wide Web pages on their classroom TV via two-way cable link-up.**

---

tion. The most remarkable benefit of this set-up is speed. We can transmit and receive data at the full Ethernet speed of 10 Mbits/second, i.e., at 1,000 times the speed of a normal dial-up phone line. This high-speed link makes it possible for our fourth- and fifth-grade detectives to be full-fledged multimedia web researchers using a web browser such as Mosaic.

---

**The magic highway, which can take us around the globe or even into outer space, is, of course, the World Wide Web.**

---

### **Watching the World Wide Web on TV**

How are students able to see the web screens on the computer? After all, the ChannelWorks box and its PC are tucked away in a back room at Multi-Media Classrooms, far away from the students' schools.

The key to it all is cable TV. Students are able to see the web research pages on their classroom TVs. This is accomplished via the two-way cable link-up, which beams the web screens appearing on the computer at Multi-Media Classrooms simultaneously into the classrooms in the three districts. The computer is able to "publish" these screens over television through the use of a MediaLogic box (the Mediator). The Mediator translates the computer's RGB video to normal TV (NTSC) video, which is then broadcast over the cable line.

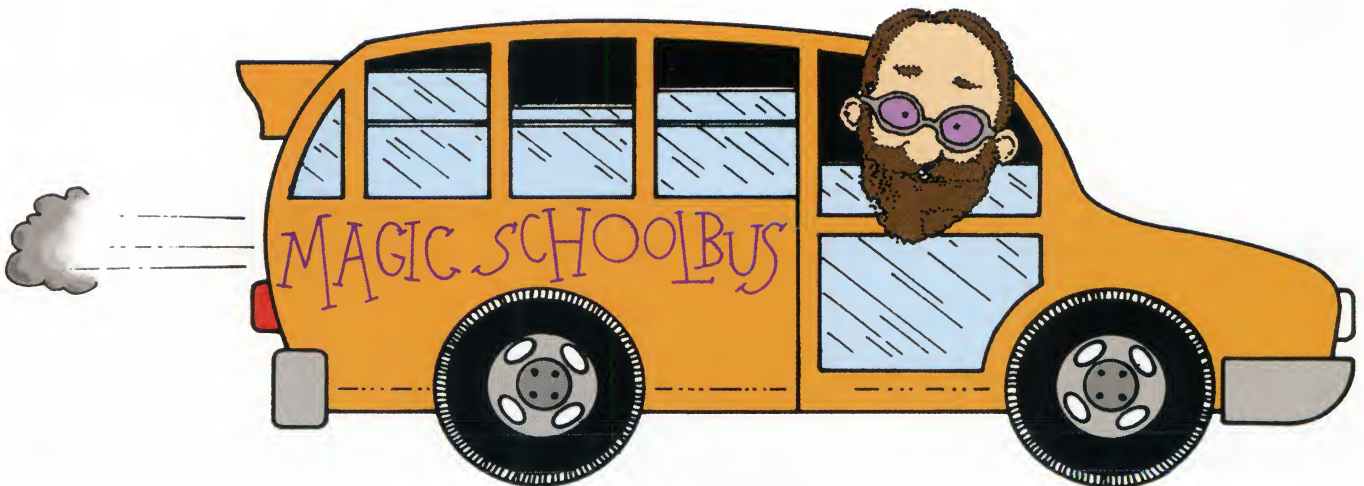
Students can see the World Wide Web pages on their classroom TV, but how can they control the remote computer located in the Multi-Media Classrooms studio? Because the cable line is two-way for audio as well as video, students are able to guide the computer operator at Multi-Media Classrooms just by talking! Each classroom has a standard video camera mounted on a tripod, with a small home-video microphone leading from the camera on an extension cord. To change the direction of exploration on the World Wide Web, students simply talk into their camera microphone and their voices come out loud and clear in the Multi-Media Classrooms studio.

### **Our Own Magic School Bus**

As a powerful metaphor to help students visualize this highly abstract process, we have been using the popular *Magic Schoolbus* books written by Joanna Cole and published in book form by Scholastic and as interactive CD-ROMs by Microsoft. We liken our cable/web connection to the Magic Schoolbus, which enables a classroom full of students to explore the world of science firsthand by traveling anywhere in space or time almost instantaneously. Our Magic Schoolbus is our PC, which has been souped up with the addition of the high-speed ChannelWorks box and the high-speed fiber optics connection provided by MSU and TCI. The magic highway, which can take us around the globe or even into outer space, is, of course, the World Wide Web. In the books, the Magic Schoolbus is driven by the students' teacher, the zany Ms. Frizzle. In our project I get to be the bus driver, and I drive our bus by clicking the mouse buttons on hypertext links that whisk us around the world on the web. And, like Ms. Frizzle in the books, I take requests from the students and drive the bus to research sites to help them find answers to their science questions.

We believe our Magic Schoolbus is something quite significant. It offers an affordable opportunity to explore the near future right now. We all hear about how we will someday have "video servers" that will be under the control of homes and institutions that are on the information superhighway. But thanks to the Multi-Media Detectives partners, fourth and fifth graders in our three districts are already controlling a shared, low-cost video server to do collaborative, real-time research at high speed on the Internet. ■

*[Fred D'Ignazio, Multi-Media Classrooms, Inc.,  
4121 Okemos Road, Suite 24, Okemos, MI 48864;  
dignazio@msen.com.]*



# Minimalist Multimedia: Authoring on the World Wide Web

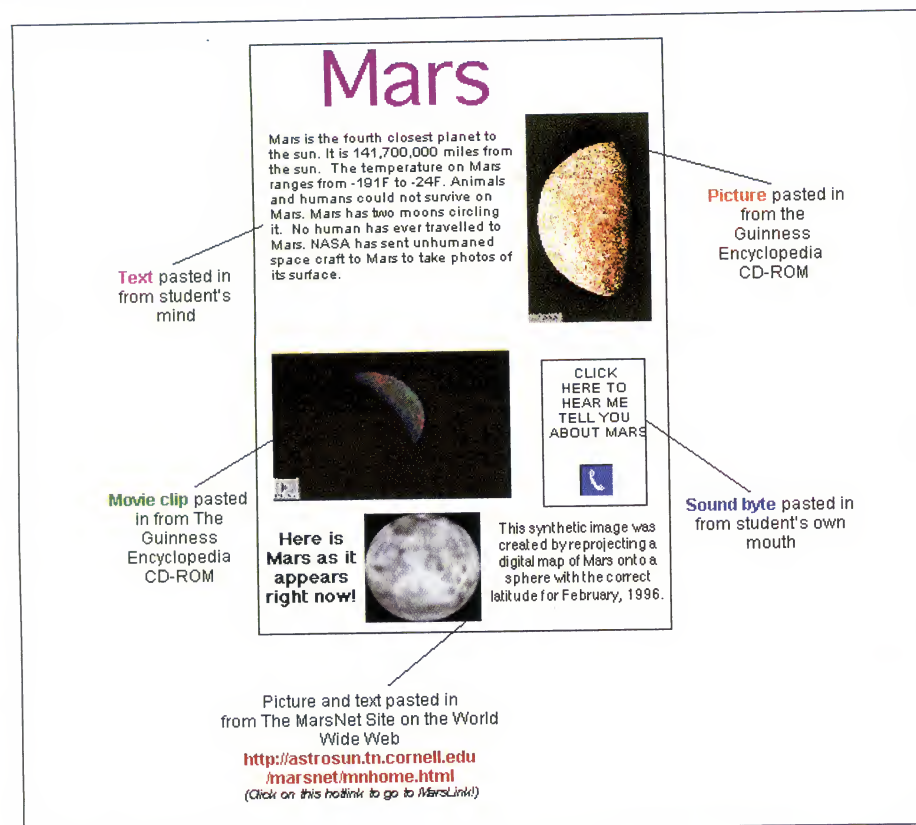


Figure 1. Eric's Mars Report.

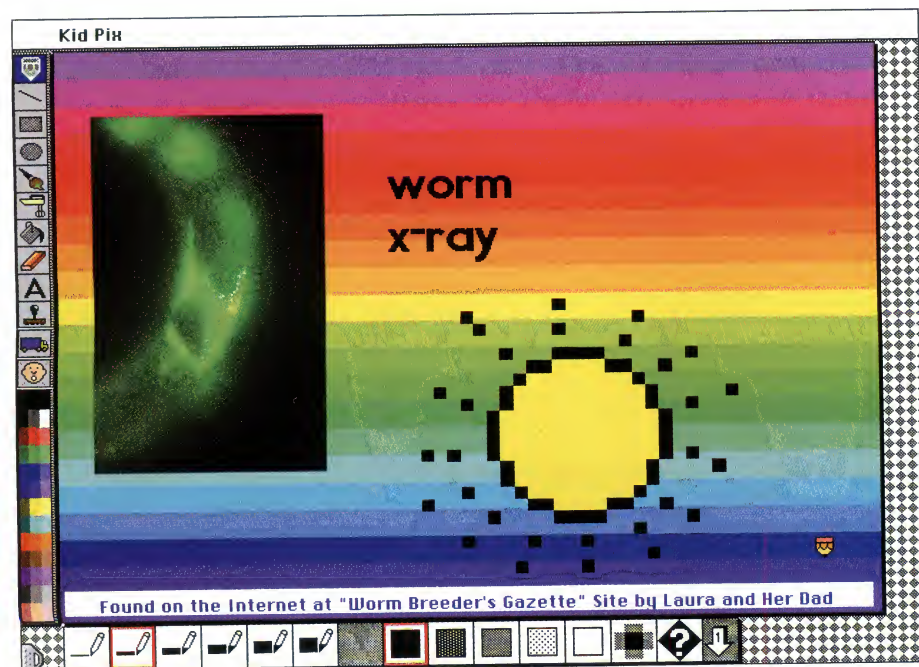


Figure 2. Laura's Worm Report.

For the last year I have been speaking around the country at conferences and doing TV shows on my concept of "Minimalist Multimedia." My own kids even use it (see Figures 1 and 2). Minimalist Multimedia is KISS multimedia—Keep It Simple to Survive! This concept involves using older programs, such as paint, drawing, and word processing programs that you already have on hand, to create multimedia and do authoring on the Internet.

The recipes on page 51 provide instructions for a minimalist multimedia project using *ClarisWorks 4.0*, which is a popular productivity package used in thousands of schools around the country. There are versions of *ClarisWorks* both for Macintoshes and Windows, and *ClarisWorks* includes a database, a paint program, and, of course, a word processor—all the types of programs that most people are comfortable using. But if you don't have *ClarisWorks*, don't despair. Minimalist multimedia works on most word processors, drawing programs, and other applications. To find out if it works on a program you use and love, just try it!

*Continued on page 50*

## The Mars Report

The three key guidelines for minimalist multimedia are:

1. Find a program you already know how to use.
2. Keep the costs low—or zero!
3. Make something quick!

In line with these guidelines I approached my 16-year-old son Eric one night and asked him to create a multimedia report in *ClarisWorks* 4.0. Eric had used the *ClarisWorks* word processor for his school homework, but he had never added multimedia. Nor had he used the program to author on the Internet. In fact, we didn't even have the IBM version of *ClarisWorks* installed on our home computer. Because of this, I assigned the task to Eric and figured I wouldn't see any products for a day or two. My wife and I wished Eric good night, and went right to bed.

An hour later a knock on our bedroom door awakened us. Eric stuck his head through the door. "Dad," he whispered, "I'm done. Come and look."

"Can't this wait until tomorrow?" I groaned, my face buried in my pillow.

"Daaaad," Eric pleaded.

I got up and trooped barefoot into the family study. Eric had created his Mars Report on the word processor and transferred it to the *ClarisWorks* Draw program to illustrate it, all in under an hour! Figure 1 (page 49) shows what I saw.

Eric's Mars Report was definitely an example of minimalist multimedia. And I was tickled pink the next morning when I successfully copied the Mars Report file on an IBM disk, transferred it onto my Mac, and popped it up on my Mac screen. It looked the same as on the PC. "Minimalist multimedia," I sighed happily. "No hassle, no muss, no fuss. It just works. Yes!"

Later that day when Eric came home from school, we used the new Internet-friendly HTML tools built right into *ClarisWorks* 4.0 (see Figure 3) and created Internet (HTML) documents that could be read by the popular *Netscape* browser. We didn't have to author our own HTML files or learn the HTML language. We stayed inside the *ClarisWorks* word processor the whole time. When we saved our file, it automatically created an HTML file and a *ClarisWorks* word processing file. We pointed the *Netscape* browser at the HTML file, and it read it right away!

## Dance to Your Word Processor!

On page 51 I have included a whole cookbook of recipes for all you minimalist authors out there who are suffering from multimedia "OD." These recipes were designed for *ClarisWorks*, so if you have access to that program you can start immediately creating word processing files that show movies, play Beethoven, and show pictures and animations. When your word processor starts playing Songo music from Cuba or World Beat music from Africa, you may even kick up your heels and begin to dance. Think of it: dancing to your word processor! Who says word processors are "state of the past"? Not my word processor, and I'll bet your word processor is multimedia-ready too. You just have to try it!

## KidPix on the Internet

Now that you know about minimalist multimedia, go back to your computer, pick a program, and do something special with it. It is surprising what you will come up with. Even the simplest programs may be multimedia-ready, so you can do neat things off and on the Internet.

Take *KidPix*, the popular paint program from Brøderbund Software. My seven-year-old daughter Laura and I were doing a Worm Report one night as homework for her first-grade class. We were about to draw a picture of a worm in *KidPix*, when Laura suggested we try looking up "worms" on the Internet. I launched *Netscape*, entered "W-O-R-M" into the search box for Digital Equipment's popular "Alta vista" search engine (<http://www.altavista.digital.com/>), and pretty soon Laura and I were learning more about worms than we ever wanted to know. At The Worm Breeder's Gazette site, Laura discovered a picture of a worm X ray that fascinated her. On a whim, I held down the *Netscape* mouse button, chose Copy Image to Clipboard from the pop-up dialog window, and switched back to the *KidPix* program.

I went to the Edit menu in *KidPix*, chose Paste, and, voila!, Laura had a genuine worm X ray from the Internet for her Worm Report in *KidPix*. The whole process took about 15 seconds! Figure 2 (page 49) shows her report. It is a perfect example of minimalist multimedia since it was quick, it was done in a program our family already had (*KidPix*), and it is only one page long.

## Conclusion

The two reports Eric and Laura created are good examples of the kind of work students of all ages can do with minimal multimedia resources. Flexibility and creativity is all it takes for you to add this new dimension to your students' work.

[Fred D'Ignazio, Multimedia Classrooms, Inc., 4121 Okemos Road, Suite 24, Okemos, MI 48864; [dignazio@msen.com](mailto:dignazio@msen.com)]

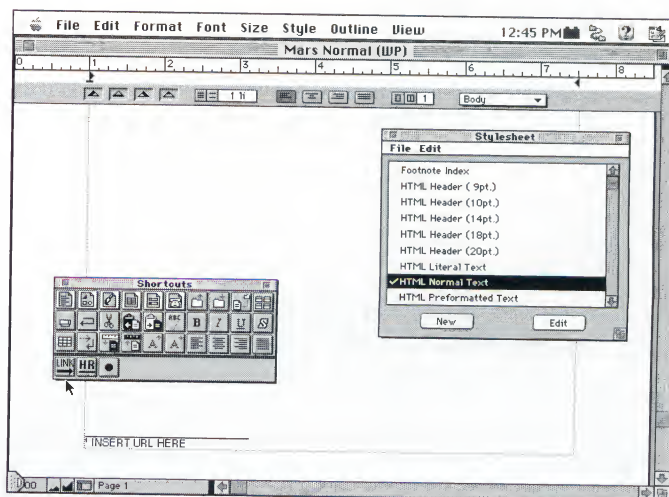


Figure 3. Shortcuts tool palette and Stylesheet palette.

# ClarisWorks 4.0 Minimalist Multimedia Recipes

All recipes in this section are written for *ClarisWorks 4.0* for the Macintosh. However, you should be able to easily adapt them to other software programs with multimedia capabilities.

## Adding Multimedia to a Word Processor Document

To add a picture file, voice file, movie file, or MIDI music file from your hard drive or CD-ROM:

1. Open an existing document or create a New document.
2. Select Insert from the File menu.
3. Find the file name for the picture, voice, movie, or MIDI file you want to insert. Double-click on it to insert it into your document.

## Creating an Internet Document

1. Launch *ClarisWorks*.
2. In the New Document window, click the Use Assistant or Stationery box.
3. Choose All Stationery in the Category menu.
4. Scroll through the All Stationery window and double-click on WWW (HTML) Document.

## Using Internet Shortcuts

1. After creating the Internet document in the previous section, choose Shortcuts and then choose Show Shortcuts in the File menu.
2. The Shortcuts tool palette appears with three Internet shortcuts as the last three tools: Hotlinks, Horizontal Rules, and Bullets. Figure 3 (page 50) shows the palette.

## Using the Internet Style Sheet

1. Choose Show Styles from the View menu.
2. The Stylesheet palette appears (see Figure 3) with the several choices, including HTML Header(s), HTML Normal Text, and HTML Preformatted Text.

## Creating New Internet Text

1. Select an HTML style from the stylesheet.
2. Type in the text.

## Converting Existing Text to Internet Style

1. Highlight the existing text.
2. Select an HTML style from the stylesheet.

## Creating Internet Hot Links (Part 1)

1. Highlight the text you want to hot link.
2. Click the Link button in the Shortcuts palette.

## Creating Internet Hot Links (Part 2)

1. Launch *Netscape*, the Internet browser.
2. Go to a Web site with hot links (colored, underlined text).
3. Point to the hot link you want to capture and hold down the mouse button.
4. When the menu appears, select Copy This Link Location.

## Creating Internet Hot Links (Part 3)

1. Switch back to *ClarisWorks*.
2. Highlight the Insert URL Here footnote at the bottom of the page.
3. Paste the hot link over it.

## Coordinating ClarisWorks With Netscape

1. Run *Netscape* and *ClarisWorks* at the same time.
2. Save the file in *ClarisWorks* and check it in *Netscape* by selecting Open File from the *Netscape* File menu. Open your HTML file.
3. The second time you return to *Netscape*, click Reload to open the file. (Do this each time you change your HTML file in *ClarisWorks*.)

## Saving Files as HTML (Internet) Files

1. Don't select Save in the *ClarisWorks* File menu or you will save the file as a regular word processor file. Instead, choose Save As in the File menu.
2. Scroll through the Save As drop-down menu and select WWW [HTML]. Give the file a distinctive name and click Save.
3. This is the file you should open in *Netscape* by choosing Open File from the File menu.
4. If you open the HTML file in *ClarisWorks*, it will appear as coded text, as shown in the following example, which is a brief excerpt from Eric's completed Mars Report document.

```
<HTML>
<HEAD>
<TITLE>mars4.html</TITLE>
</HEAD>
<BODY>
&lt;HTML&gt;<BR>
&lt;HEAD&gt;<BR>
&lt;TITLE&gt;mars1.html&lt;/TITLE&gt;<BR>
&lt;/HEAD&gt;<BR>
&lt;BODY&gt;<BR>
<BR>
...
```

## Updating Internet Files

1. You still need to save your special *ClarisWorks* word processing file for further editing.
2. In *ClarisWorks*, click on Save in the File menu to save the file. Use a different name than you used for the HTML file.
3. After saving it as a *ClarisWorks* file, you can open it later and edit it.



# A MULTIMEDIA PUBLISHING CENTER

## FROM SCRATCH (AND SCAVENGE)

By Fred D'Ignazio

**Y**ou'd probably love to turn your media center into a place for students to use exciting new multimedia tools for research, authoring, and publishing.

If only you had a budget to afford these tools!

Because of the high cost of multi-media paraphernalia such as digital cameras, scanners, multimedia sound cards, LCD panels, CD-ROM drives, and laser disc players, media specialists are often stymied in their plans to create student publishing stations.

Don't despair! You can create student publishing stations in your media center. The trick is to think beyond all that expensive multimedia equipment to what you are really seeking: positive student outcomes. Your students can construct their own research, authoring, and publishing stations out of equipment scavenged from around your school and from students' homes. Besides creating usable stations, students will reap other rewards as well.

**1** Students will feel ownership and pride as they "invent" their own publishing stations.

**2** An atmosphere of sharing, cooperation, and innovation will emerge as students find ways to pool resources and make their stations work.

**3** Students from different grades and classes will build a reservoir of expertise together.

**4** Those in the multimedia club can share their expertise through demonstrations, open houses, and "cookbooks."

**5** Students will build a solid foundation in the components of multimedia: speaking, videotaping, sound effects, graphics, scriptwriting, planning, and producing. After this "pre-multimedia phase," your students will be prepared as you acquire advanced tools that combine several multimedia elements.

*The trick is to think beyond all that expensive multimedia equipment to what you are really seeking: positive student outcomes.*

**6** By learning how to create the text, sounds, images, page layout, and hypermedia links on their simpler "mini-center" workstations, students are preparing to publish online on the World Wide Web.

### A RECIPE FOR SUCCESS

**Step One:** Organize a multimedia club and select a few key student members and parent or teacher helpers.

**Step Two:** Ask the students to sign a contract as multimedia consultants, authors, or coaches. Make it clear that students are learning so they can act as "service" or "outreach" teams

to help everyone in the school.

**Step Three:** Ask students to conduct an inventory of all equipment that can be "scavenged" from the media center, the school building, and their homes. This involves parents and classroom teachers and encourages students in the multimedia club to cooperate, be resourceful, and plan with scarce resources. (See page 22 for sample inventory.)

**Step Four:** Show students how to group the equipment into publishing mini-centers. Each team is responsible for:

- Locating the appropriate equipment
- Hooking it together
- Making it work
- Writing "recipes" to help other students use the centers to create their own research, authoring, and publishing projects.

The mini-centers can be organized around the edge of the library as a "publishing wheel." Students can train other students by rotating them along this wheel as "test pilots" for their recipes (tutorials).

**Step Five:** Ask student teams to construct a digital publishing station as the "hub" station for their publishing wheel. The mini-centers along the edge of the wheel are used to create the multimedia components to feed the hub station. These components include: word processing narratives, poems, stories, quotes from books, images, video and audiotapes.

Your students may have experience hooking up their Nintendo, Sega, and Genesis game systems. They can use the "picture page" the same way they use Lego Blocks pictures to plug in all the cables. (See below.)

As soon as all the cables are plugged in and tested, ask your students to label all the tapes and the switch boxes in case they become unplugged. Certainly it is more work for you to organize students into "construction crews" that assemble their own publishing stations.

On the other hand, you will witness a transformation in these students' attitudes—toward you, your media center, books, and even toward school. In particular, you will see an improved attitude from students who have different learning styles as they find opportunities to make contributions to their teams.

*Fred D'Ignazio is President of Multi-Media Classrooms, Inc.*



## MULTIMEDIA CLUB SAMPLE STUDENT CONTRACT

I \_\_\_\_\_ (name) will work with my fellow students to help make the multimedia club a success. I will do the following to help our media specialist:

- (1) Scout out, locate, and assemble new technologies for use in our club.
- (2) Manage and operate all equipment safely, fairly, and politely.
- (3) Troubleshoot, solve problems, and figure out how to use our equipment for learning, teaching, and authoring.

I will share responsibility with other students for writing up simple guides ("recipes") which help others learn to do useful tasks with equipment.

I will divide my time between learning the new technologies for myself and sharing what I know with others (club members, media specialist, and parents).

I understand that our media specialist can't figure out new technology alone. He or she needs the help of every student in the club to: (1) Scout out the best technology; (2) Bring it into the club; (3) Set it up and make it work; (4) Teach others how it works; and (5) Manage projects so everyone in the club (including our media specialist) gets experience working with the technology to do useful and cool things.

As a technology helper and coach, I will try to remember what it feels like to be a new learner in an unfamiliar area. I will be polite and use kind words to encourage others to take their first steps into technology. And I will try to keep on schedule in all my personal projects and team projects.

Last, I will remember that my grade is less dependent on my being a technical whiz kid and more on my being a good teacher, friend, and helper.

Student's signature \_\_\_\_\_

Specialist's signature \_\_\_\_\_

Parent's signature \_\_\_\_\_

## MULTI-MEDIA WORKSTATION STARTER KIT CABLES, SWITCHES & ADAPTERS

COPYRIGHT © 1994 MULTI-MEDIA CLASSROOMS, INC.

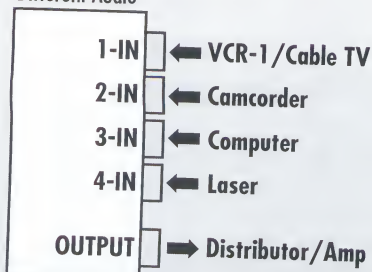
All Items Listed Below Are Available at Your Local Radio Shack!  
(Just take this list to a Radio Shack salesperson and have them pick out all the items.)

ITEM	STOCK#	QTY	PRICE	TOTAL
A/V Switch-Stereo	15-1956	2	24.99	49.98
A/V Distributor-Amp	15-1103	1	29.99	29.99
6-Foot VCR A/V Cable	15-1535	2	3.99	7.98
6-Foot Audio Cable	42-2367	4	2.49	9.96
6-Foot Stereo A/V Cable	15-1537	2	7.19	14.38
Y-Adapter (1 Plug to 2 Jacks)	42-2436	2	2.69	5.38
Y-Adapter (1 Jack to 2 Plugs)	42-2435	2	2.79	5.38

ITEM	STOCK#	QTY	PRICE	TOTAL
Microphone & Stand	33-2001	1	11.99	11.99
Phones Plug to 2 Phono Jks (6')	42-2481	2	4.99	9.98
Phono Jack to 1/8-inch Plug	274-378	2	2.49	4.98
Phono Jack to Mini Plug	274-330	2	1.69	3.38
PK2 Phono Plug Adapter	274-320	1	2.73	2.73
PK2 Dual Phono Jacks	274-1553	3	1.39	4.17
TOTAL				160.48

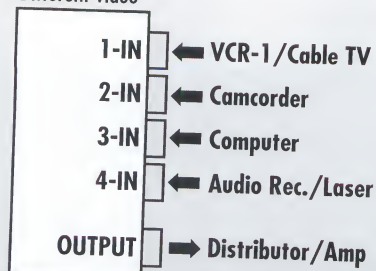
For more information, please contact: Multi-Media Classrooms, Inc. ▲ 4121 Okemos Road ▲ Suite 24  
Okemos, MI 48864 ▲ 517-349-1340 ▲ FAX: 517-349-3657 ▲ E-MAIL: dignazio@msu.edu

Purpose: Lets You Mix Video with  
Different Audio



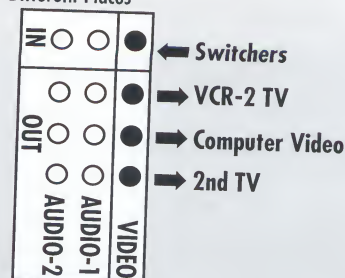
Uses Standard Radio Shack AV Cables

Purpose: Lets You Mix Audio with  
Different Video



Uses Standard Radio Shack AV Cables

Purpose: Lets You Send Your Multimedia  
Different Places



Uses Standard Radio Shack AV Cables



# CHECKLIST FOR PLANNING AND ASSEMBLING MINI-CENTERS

The following checklist is neither mandatory nor exhaustive. You and your students should use this list along with your home and school inventory lists.

It is up to you to construct customized mini-centers which best fit you, your students, and your classroom. Also, don't try to assemble all the centers at once. Ideally, the Phase One "mini-center" process should take anywhere from one month to an entire semester.

Here are some suggestions for center components.

## TYPICAL AUDIO CENTER COMPONENTS

- \_\_\_ Tape recorder
- \_\_\_ Microphone, headphones
- \_\_\_ Blank tapes

Optional background sounds:

- \_\_\_ Tape recorder #2 (or CD Player, Boombox, or CD-ROM Player)
- \_\_\_ Sound effects tapes (or CDs, or CD-ROMS)
- \_\_\_ Small musical keyboard
- \_\_\_ Record player and records
- \_\_\_ Live instruments or live voices

## TYPICAL VIDEO CENTER COMPONENTS

- \_\_\_ Video camera
- \_\_\_ Tripod music stand
- \_\_\_ Masking tape
- \_\_\_ Blank videotapes
- \_\_\_ Microphone, headphones

Optional video backgrounds:

- \_\_\_ Segments taped from CNN NewsRoom
- \_\_\_ Segments taped from other copyright-free cable
- \_\_\_ Educational tapes such as *National Geographic*, *NOVA*, *Smithsonian*
- \_\_\_ Personal videotapes

## TYPICAL WRITING CENTER COMPONENTS

- \_\_\_ Notebooks, pencils, pens

Optional:

- \_\_\_ Word processing program
- \_\_\_ Computer
- \_\_\_ Printer
- \_\_\_ Blank disks

## TYPICAL GRAPHICS CENTER COMPONENTS

- \_\_\_ Markers, crayons, paints
- \_\_\_ Poster board, construction paper

Optional:

- \_\_\_ Paint program or graphics program (*HyperStudio*, *LinkWay*, *Multimedia Scrapbook*) (*ClarisWorks*, *KidPix*, *PrintShop Deluxe*, *Creative Artist*)
- \_\_\_ Computer
- \_\_\_ Printer

## TYPICAL RESEARCH AND CAPTURE CENTER COMPONENTS

- \_\_\_ Books, magazines, newspapers
- \_\_\_ Note cards, pens, pencils

Optional (Low-Cost):

- \_\_\_ Computer
- \_\_\_ Microphone, headphones
- \_\_\_ Sound card (PC only)
- \_\_\_ Music stand (for propping up objects to be captured)
- \_\_\_ *HyperStudio* (Mac/ILGS), *Multimedia Scrapbook* (Windows), *LinkWay* (DOS)

Optional (Higher-Cost):

- \_\_\_ Cable TV
- \_\_\_ VCR/TV and educational tapes
- \_\_\_ Laserdisc player, laserdiscs
- \_\_\_ CD-ROM player, CD-ROM clip images, and sounds
- \_\_\_ Hand scanner such as *Logitech*
- \_\_\_ Digital camera such as Apple's *QuickTake*, *Logitech's PhotoMan*, SuperMac's *VideoSpigot*, or Digital Vision's *ComputerEyes*

## TYPICAL TELECOMMUNICATIONS CENTER COMPONENTS

- \_\_\_ Computer
- \_\_\_ Modem and computer cable
- \_\_\_ Phone jack to outside line
- \_\_\_ Phone cable between modem and jack
- \_\_\_ Modem software such as *ZTerm* (Mac), *ProComm*, *ClarisWorks*, *WinTerm*
- \_\_\_ Telecommunications service such as Prodigy, CompuServe, America Online, or a local bulletin board (and local dial up number!)

## TYPICAL LAYOUT AND EDITING CENTER COMPONENTS (OPTIONAL)

- \_\_\_ *HyperStudio* (Mac/ILGS), *Multimedia Scrapbook* (Windows), *LinkWay* (DOS)

Optional:

- \_\_\_ Inspirational software for brainstorming, editing, visualizing, writing

## TYPICAL MULTIMEDIA PUBLISHING CENTER COMPONENTS

- \_\_\_ Computer with multimedia program

To publish on paper:

- \_\_\_ Printer, paper, cartridges
- \_\_\_ Labels and card stock for student business cards
- \_\_\_ Poster paper and construction paper for signs and posters

To publish on diskette:

- \_\_\_ Blank student diskettes

To publish on audio tape:

- \_\_\_ Audiotape recorder
- \_\_\_ Blank tapes

To publish on videotape:

- \_\_\_ Video camera and tripod (Point camera at computer screen while students narrate script into the camera microphone.)

Optional:

- \_\_\_ *Presenter Plus* (or *TelevEyes*) computer-to-video converter
- \_\_\_ Radio Shack cables and adapters
- \_\_\_ VCR
- \_\_\_ TV
- \_\_\_ Blank videotapes (student "portfolio" tapes or "project" tapes)

To telepublish over network:

- \_\_\_ Telecommunications center (see heading above)
- \_\_\_ Software such as *ProComm Plus* that lets you attach sound files, image files, or other files to e-mail
- \_\_\_ Bulletin board, databases that store students work

Optional:

- \_\_\_ *CUSEE Me* Video Conferencing Software (for Mac or PC) on the Internet
- \_\_\_ *Mosaic* (NCSA "Freeware" or commercial version)
- \_\_\_ Multimedia Document and document browser software

## LIVE TUTORIALS

Student teams can present exhibits and tutorials in front of the class. Teachers can tape these presentations and dub the tapes onto the students' videotape "portfolios." These tapes create vivid and dramatic evidence of students' evolving oral communication skills, cooperative learning skills, and technology skills.



# MULTIMEDIA INVENTORY

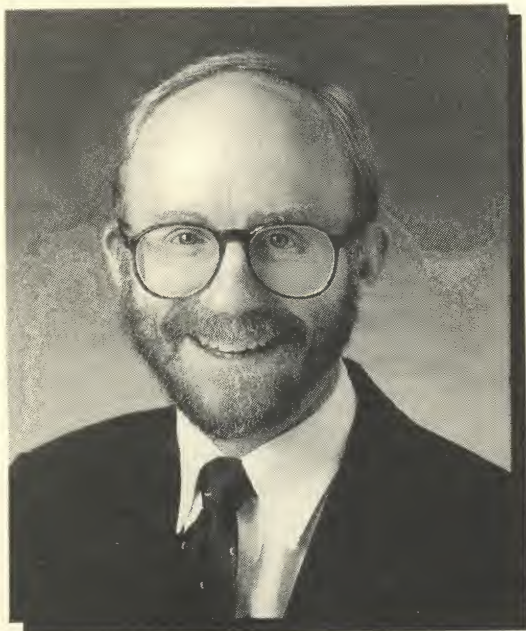
EQUIPMENT AVAILABLE FULL-TIME (F), DAILY (D), OR WEEKLY (W)

(Source: \_\_\_\_ Home \_\_\_\_ School)

School/Student Name \_\_\_\_\_ Phone \_\_\_\_\_

ITEM/ EQUIPMENT	NUMBER ON HAND	MAKE/KIND AVAILABLE	(F, D, or W)	ITEM/ EQUIPMENT	NUMBER ON HAND	MAKE/KIND AVAILABLE	(F, D, or W)
1. Wheeled Cart	_____	_____	_____	26. Graphics/ Paint Programs	_____	_____	_____
2. Headphones	_____	_____	_____	27. Multimedia Programs	_____	_____	_____
3. Microphone	_____	_____	_____	28. Blank Videotapes	_____	_____	_____
4. Record Player	_____	_____	_____	29. Blank Audiotapes	_____	_____	_____
5. Tape Recorder	_____	_____	_____	30. Blank Diskettes	_____	_____	_____
6. Musical Keyboard	_____	_____	_____	31. Computer Paper	_____	_____	_____
7. PowerStrip/ Ext.Cords	_____	_____	_____	32. Printer Ribbon/ Cartrdg.	_____	_____	_____
8. VCR	_____	_____	_____	33. AA & 9-Volt Batteries	_____	_____	_____
9. TV/Monitor	_____	_____	_____	34. AV Switch Box	_____	_____	_____
10. Camcorder	_____	_____	_____	35. AV Cables	_____	_____	_____
11. Pocket Camera	_____	_____	_____	36. AV Cable Adapters	_____	_____	_____
12. Polaroid Camera	_____	_____	_____	37. Laserdisc Player	_____	_____	_____
13. Camera Tripod	_____	_____	_____	38. Laserdiscs	_____	_____	_____
14. CD Player	_____	_____	_____	39. CD-ROM Player	_____	_____	_____
15. Radio	_____	_____	_____	40. CD-ROMs	_____	_____	_____
16. Educational Videos	_____	_____	_____	41. Video Capture Card/Box	_____	_____	_____
17. Educational Audiotapes	_____	_____	_____	42. Audio Capture Card/Box	_____	_____	_____
18. Records	_____	_____	_____	43. Computer Video to VCR/TV Converter	_____	_____	_____
19. Audio CDs	_____	_____	_____	44. Modem	_____	_____	_____
20. Markers, Crayons, etc.	_____	_____	_____	45. Phone Line to Room	_____	_____	_____
21. Poster Paper, etc.	_____	_____	_____	46. Phone Cable	_____	_____	_____
22. Music Stand (Copy Stand)	_____	_____	_____	47. Modem Software	_____	_____	_____
23. Computer	_____	_____	_____	48. Other	_____	_____	_____
24. Printer	_____	_____	_____	49. Other	_____	_____	_____
25. Word Proc. Software	_____	_____	_____	50. Other	_____	_____	_____

# Special Guest Speaker



Fred D'Ignazio is a monthly TV commentator on the national television show, *Learning Matters*, on PBS. He has authored 26 books, a dozen instructional videotapes, nearly one hundred interactive multimedia presentations and dozens of commercial software programs. His articles and columns have appeared in publications as varied as *Instructor*, *The New York Times*, *Highlights for Children* and *The Washington Post*. He has organized multimedia telecommunication links and written commentaries for ABC-TV, PBS, Discovery Cable and National Public Radio. His teaching experience includes faculty positions at institutes in Brazil, Portugal, England, Canada and the U.S. (most recently at Simon Fraser University in Vancouver, BC and Lesley College in Cambridge, MA). Fred has presented multimedia workshops in more than 60 school districts around North America. Fred was part of the 6-member Super Panel at the World Congress on Computers in Education, in Vancouver, Canada and the Keynote Speaker for the Australian National Conference on Computers in Education. As Director of the Michigan Teacher Explorer Center, Fred has trained over 6000 school administrators, teachers, parents and students from 150 Michigan school districts and from 18 states around the U.S. He was recently featured in *New*

## FRED D'IGNAZIO

**President, Multi-Media  
Classrooms, Inc.  
Commentator, PBS—TV**

### **"Multimedia in Education: Moving Towards a Collaborative Learning Environment"**

*Media* and *Teacher* magazines and he teaches interactive telecourses that are broadcast to Canada and 40 states around the U.S. via the TI-IN Satellite Network, Mind Extension University and instructional fiber-optics networks.

#### ***Fred's session will cover the following:***

Today, children work alone. They receive knowledge as isolated units, which they are somehow to assimilate and master. They then come back to the teacher and say, "Teacher, this is what I've learned," and an assessment is done on a one-to-one basis.

This is very artificial, in terms of the way that children interact everywhere else outside the classroom and the way that we hope to see them interact in the workplace. The new goal that many educators are moving towards now is a cooperative, collaborative classroom. Instead of the idea of personal computing, you would have interpersonal or collaborative computing. Children would work in teams. They would act as co-teachers. The teacher *manages* the learning process with these teams of students working collaboratively and independently on lots of learning projects that the teacher can assign. ■

## **1992 Emphasis on Technology Conference**

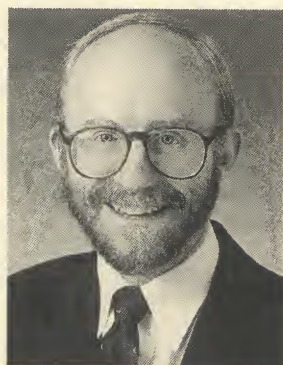
Hosted by Educational Resources, 9/18/92

For a FREE copy of A Guide to Learning, please call 1-800-277-0829.

# Technology for Children

by Fred D'Ignazio

No matter how *you* feel about technology, your children will be exposed to it at work, at play, while they sleep and when they are awake. Soon, tiny computers will be embedded in the walls and floors of homes, furniture, clothes, jewelry, tooth fillings, and throughout human bodies. The momentum of these technologies is mammoth and monolithic. You can't stop it or control it. But you can insure that your children's experiences with technology will not be passive, trivial and self-deflating. . .by following these strategies:



*Start young.* Computers, video cameras, tape recorders and CD players are getting safe enough to be operated by toddlers—with some common-sense supervision by Mom and Dad. Trust your kids to operate these tiny appliances and you will be surprised at how they use them in ways you never thought possible.

*Do it together.* Your children rarely use technology to create, to think or to work. Mostly they use it to consume. Encourage them to use technology as authors, detectives, artists and musicians. Let them create images and video scrapbooks with your home video camera. Teach them how to write journals, letters and school reports on their computer. Once children feel a pride of authorship, they will never again view technology the same way.

*Be playful.* Don't make technology tedious. Your children need to be playful, experimental and inventive. Expose your children to all sorts of creative

applications of technology—even video games—and let them decide what they like to do most. Then stand back. Children's aptitude for technology far exceeds ours. Given the opportunity, they never tire of showing it—without Mom, Dad or a teacher out there showing them the way.

*Be collaborative.* Look for opportunities for your children to use technology to connect them to other people. For example, there are hundreds of children's computer networks that for a few pennies can link your child via telephone modem to other children across town or around the world.

*Get them a computer.* Powerful computers soon will be only \$400—\$500. Soon all media—TV, radio, books, music, painting, movies, etc.—will be on computer. The computer will control everything. People skilled at controlling the computer will be masters of all other technologies. Get your kids a computer. It's the electronic pencil of the 21st century. No kid can make it without one.

*This article appears in A Guide to Learning by Fred D'Ignazio and the creators of the PBS series "Learning Matters," Fall 1992, page 5. Fred D'Ignazio is president of Multi-Media Classrooms in Okemos, Michigan.*

*To contact Fred, please write Multi-Media Classrooms Inc., 4121 Okemos Rd. Suite 24, Okemos, Michigan 48864; (517) 349-1340, Fax: (517) 349-3657.*

Watch for Fred each month on "Learning Matters," a national PBS - TV show broadcast on over 200 local public TV stations.

## TOWARD A COLLABORATIVE LEARNING ENVIRONMENT

*Fred D'Ignazio is one of the leading pioneers in multimedia-based education today. As founder and director of the Teacher Explorer Center in East Lansing, Michigan, D'Ignazio has coached 7,000 teachers from school districts nationwide on the theory and methodologies of multimedia education. He also heads his own consulting firm, Multimedia Classrooms.*

*In a recent interview with the author, D'Ignazio shared his perspective on the ideal learning environment for schools, one particularly well-suited for elementary and middle schools:*

**T**oday, children work alone. They receive knowledge as isolated units, which they are somehow to assimilate and master. They then come back to the teacher and say, "Teacher, this is what I've learned," and an assessment is done on a one-to-one basis.

To me, this is very artificial, in terms of the way that children interact everywhere else outside the classroom, and the way that we hope to see them interact in the workplace. The new goal that many educators are moving toward now is a cooperative, collaborative classroom. Instead of the idea of personal computing, you would have interpersonal or collaborative computing. Children would work in teams. They would act as co-teachers. The teacher *manages* the learning process with these teams of students working collaboratively and independently on lots of learning projects that the teacher can assign.

It's very different from the old classroom. In the old classroom, the teacher had to be the conduit for knowledge. It was like a pipeline. In the new classroom that many educators are evolving to, and that I think multimedia supports, you have multiple conduits. Children are learning things that maybe the teacher doesn't even know. And they are learning them in an individualized and customized way that the teacher maybe hasn't even picked up on yet, because it is the way that the child approaches it.

There might be six teams of kids, four kids per team, working at six learning centers in the room. The teacher now needs to blend those groups thematically together, and allow them to share with the classroom as a whole—in a sense allowing them to co-teach the lesson. It just accelerates the learning process.

The overriding theme is not simply technology, but how you can use these powerful tools to *accelerate learning* in the classroom, to engage *all* the students, to encourage them to work cooperatively, to encourage them to do more critical thinking and trouble-shooting, to increase their communications skills—and then, finally, how you can improve their ability to present and share knowledge, to participate as a teacher by sharing things that they are discovering about that week's curriculum unit.

### ■ Nintendo SWAT Teams

Children are often so much more adept than teachers in the mechanics of technology—they can master a program quicker, they can hook up a cable, or even often do trouble-shooting in a far superior way to their teachers. They are like "Nintendo boot camp" graduates—and we need to tap them as a kind of "Nintendo SWAT team" for the classroom. Teachers are saying, 'I can't have computers in my classroom. What if they go wrong? I need to master them first ...' And they fear (and secretly know) that the kids are going to run circles around them.

Teachers fear that technology is going to make them look worse, and that the kids will run out of control. Teachers need to realize that they can enlist students in a meaningful role—as a tech support team!

### ■ Interactivity, Exploration

The physical act of 'clicking' a mouse seems to have a strong attractiveness to kids. It makes a child feel in the driver's seat. So

much of education in the old model is the teacher in the bus driver's seat—and the kids in their little rows of desks in the bus seats. The teacher drives the bus and takes it wherever he or she chooses to take it. Then the kids act up, just like kids on a bus.

With multimedia, you can change the design so that the *kids* are the explorers, and each group of kids is a group of explorers. Each group of kids has their own vehicle—the multimedia station—and the kids rotate control...each kid has a chance to be the driver. Then you rotate teams through the various stations.

It's like the bridge on Star Trek. Kirk may be in command, and that's the teacher's role in the future, but there are teams of people around the bridge—an engineering team, a math team, maybe a planetology team, a history team. Thematically, the teams propel a classroom through a learning space.

I've been in some classrooms where I can talk to the teacher for four hours straight, right in the middle of the day. And I look around the room from time to time in disbelief. The class runs itself. The kids are so empowered. They are responsible for learning, for being on schedule, for not doing dysfunctional behaviors like fighting or hogging equipment. They really do enjoy what they are doing. If the teacher opened her classroom on a Saturday, a lot of these kids would come in! This class is one of the most enjoyable things that they have been called upon to do in their lives.

Kids who don't have a meaningful role are going to do something bad. They are going to either act up, drop out, tune out, have physical problems, lowered energy, and so on—and learning is therefore more difficult. By contrast, that feeling of helping to guide the ship and make it successful is the model that I want each classroom to embody in the future. ■

# D'IVERSIONS

Fred D'Ignazio

## A SWARM OF NAKED PUPPIES

Have you ever thought of the contrast between the way you learn now and the way you learned as a child?

Recently, I've been an observer of two laboratories of learning: one in a high school and one here in my study. In the high school, I watch teachers learning on computers. At home, I watch two toddlers—Laura, 3, and Tommy, 2½—also learning on computers.

The contrast in their learning styles couldn't be more dramatic. And it's all in their body language. Body language is like a true confession of what's really going on in the learner's mind.

The teachers enter the computer lab at the high school in tight little clusters. They joke nervously and loudly, and they immediately ask where the rest rooms are and how soon they can have their first coffee break. When they sit at the computers, they push their chairs as far away from the tables as possible, sometimes so far that it's impossible to reach the computer keys.

Once the class begins, the teachers are supposed to begin team projects that encourage them to get up and move about. However, most teachers stay glued to their chairs, as if to say, "This is where we are supposed to learn. We are the audience; you are the performer. You jump up and down and be interesting, and we'll stay seated."

Tommy and Laura enter the study in a slightly different manner, more like shock troops, gangbusters, and tornadoes! By the time they get to the study, they have managed to lose most or all of their clothing and have become "naked puppies." And these puppies don't just mosey into the

study—they swarm, they gallop, and they stampede! They bang open the study door; attack both of the computers by immediately pressing all the keys and jerking the poor little computer mice this way and that; and all the while giggle, shout, and jump around. And they never sit down!

The computers are usually in "sleep" mode when the puppies arrive. Their screens are lit up with little fishbowls or scenes of sleepy cityscapes. "Wake up, computer!" Laura yells, as she clicks the mouse and knock-knock-knocks on the computer screen.

"L-M-N-O-Z!" shouts Tommy, as he simultaneously presses 11 keys, using both his hands and his forehead.

Puppies swarm around the computers, and they love to print. They print immediately. They print constantly. They both know the key combinations to crank up the printer, and within a moment after they've entered the study, the printer starts spitting out pictures of crabs, cats, moons, and unicorns on skateboards.

As the puppies' teacher, I try to maintain a semblance of order in the classroom and break up fights. But, overall, the puppies get along pretty well, and I never have to remind them to stay on task.

What is their task? As their teacher, I try to lead them through their early learning programs, beginning at the beginning of the manuals and working toward the end. For some reason, this isn't the way puppies learn. While I'm still at the beginning of a manual, Laura is somehow in the icon-edit section of chapter 33, zooming in on icons, painting red hair on the sun ("See, Daddy. It's a happy face!"), and drawing legs on a pine tree. Meanwhile, Tommy is supposed to be using a music program, but he's found a key combina-

tion that turns the musical keyboard into a talking parrot. A moment later, he and Laura are talking into the computer microphone, trading insults with the parrot.

The teachers in the high-school lab spend six hours in a workshop, trying to learn more like naked puppies learn. And the miracle is that they succeed. Sometimes it takes the entire six hours, sometimes not. By the time they leave the lab, they, too, are swarming over the machines, talking, laughing, pressing buttons a mile a minute, making mistakes, and doing crazy, unpredictable, wonderful things.

Their body language tells all. As they transform from audience to performers, the teachers begin standing, walking, crouching, and crawling under tables, examining wires and cables. They carry a video camera up onto a table and shoot the classroom from a lofty angle, or they fall to the floor and adopt a toddler's eye view. As they begin to imitate my two little puppies, their excitement goes up, their enthusiasm goes up, and their noise goes up. And their learning. And their self-confidence. And their self-esteem. And their independence from their teacher.

I like adults who act like puppies. At the end of a long, exhausting workshop day, if I have a room full of big puppies (all with their clothes on, thank goodness!), I consider the workshop a success. And the teachers do, too. In fact, at this point, they don't care a bit what I think. They're too busy running around the room with video cameras, microphones, magic markers, and colored construction paper, working on projects galore. They're too busy to notice whether they even have an instructor.

That's when I know I've been a good teacher. □

**Body language is like a true confession of what's really going on in the learner's mind.**



# D'IVERSIONS

F R E D D ' I G N A Z I O

**W**e are what we dream. Our dreams of "futures past" now seem wholesome and desirable compared to today's sometimes cockeyed present.

In the 1950s when I was growing up, kids dreamed about the hot new toys of technology: TV sets, space-ships, monster computers, and transistor radios. We tuned in to family programs every night like "Dennis the Menace," "Father Knows Best," "Ozzie and Harriet," and "Lassie." We identified with the kids on the programs—kids like Bud, Frank, Ricky, Dennis, Margaret, Timmy, and Betty. We dreamed of a fantastic future—a George Jetson future where families would be just like those we saw on our favorite TV programs. Life would be a lot the same—comfortable, loving, funny, and so on. But in the future we'd also have tons of high-tech toys, just like Judy and Elroy Jetson had.

We'd have a robot. We'd have a jet car. We'd have picture phones and cosmic baseball. And we'd never have to do any work because we'd have homework machines, machines to take out the trash, machines to wash the dirty dishes and pick up our bedrooms. In the future, life would be grand!

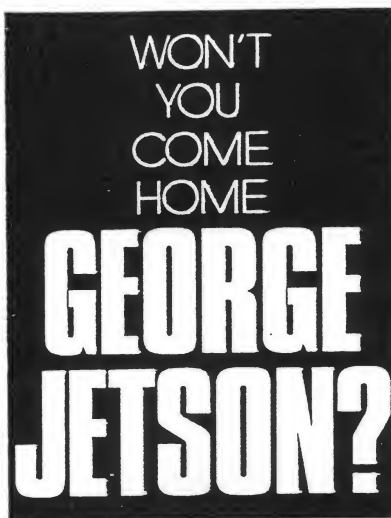
Then something sad happened. Somewhere between 1950 and 1990, we kids wandered off the yellow brick road to the Jetson future, and we never found our way back. The TV families of the 1950s were replaced by the TV families of the 1990s—"Rosalanne," "Married with Children," "The Simpsons." Families fragmented into latchkey kids, liberated women, and workaholic dads. In place of Donna Reed, kids came home to revolving-door parents and Nintendo babysitters.

Welcome to the postmodern world. A world beyond Walt Disney and George Jetson. A world of AIDS, Madonna, MTV, Ninja Turtles, WrestleMania, and *Nightmare on Elm Street*. In place of Jetson jet cars and robots, the landscape is dotted with cellular phones, Game Boys,

palmcorders, DAT Man, and CDTV.

The Jetsons movie came out recently. If you saw the film, didn't you think it seemed a little odd, a little quaint? That's because the Jetsons movie is a leftover, warmed-over dream. It's a vision of a future past. The truth is that somewhere between 1950 and 1990 the real George Jetson walked out on his kids, his dog Astro, his gadgets, his wife Jane—and he never returned.

In the 1950s we pulled up to a Texaco station, and the man who wore the star rushed out with a great big smile and served us and serviced our car. In the 1990s we roll into a



stark gasoline fortress and see hulking vandal-proof pump-it-yourself vending machines. We pay our money to a shadowy presence hidden behind protective layers of bulletproof glass, and we pump our gas through an accordion vapor-control hose that looks like an appendage of Robbie the Robot in *Forbidden Planet*.

In the 1950s kids and their parents went ga-ga over the shiny white appliances that poured out of America's postwar factories and into America's homes. There were new refrigerators, new washing machines, and

new ovens. We were sure that all that glowing white enamel was just the tip of a technological iceberg. Our high-tech home of the future would be clean, sleek, and, and cozy. And above all, American!

Cancel that dream. Technology tomorrow turned out to be tiny black boxes from Japan and Korea. The easy street to the future turned into a shortcut to the salt mines.

In the 1950s we looked forward to a future in which machines did most of the work. We were told to expect more leisure time, shorter work weeks, and a carefree existence. The George Jetson easy street was just around the corner. Technology would save us so much work that we'd have time on our hands.

Now we're in the 1990s, the decade of time deprivation. Husbands and wives both work full-time jobs. Life is a rat race. The streets and the skies are gridlocked by too many vehicles trying to travel to too many places. Technology has turned from slave to taskmaster. With fax machines, cellular phones, E-Mail, phone mail, overnight delivery services, video conferencing, and computers, we are never out of touch. We are never offline. We must never stop, slack off, or daydream. We are plugged into a network that never sleeps. We feel unrelenting pressure to work all the time. Our machines quietly goad us to work harder, faster, longer. Puff! Puff! Puff!

Our present is not necessarily better or worse than the old Jetson future. It's definitely different.

*Editor's note:* Don't forget to enter Fred D'Ignazio's Design-a-Robot contest. See last month's "D'Iversions" for a complete list of the rules.

All entries must be received by August 31, 1991. The first-place winner will receive a model robot valued at \$200; five runners-up will each receive a smaller robot valued at \$30. Send entries to Design-a-Robot Contest, COMPUTE Publications, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. □

# D'IVERSIONS

Fred D'Ignazio

## FRANK THE FIREPLACE AND LARRY THE LAMP

It's fine and magical to bring good things to life—but there is a limit.

A recent issue of the *New York Times* reported on new electronic gadgets that let you control every appliance in your home. The gadget deluxe, SmartHome, is an all-in-one product that costs \$15,000 and lets you automate over 200 common household devices. SmartHome is an alarm system and a heating and cooling controller. It starts your coffee perking at a set hour, and it starts cooking your roast. One universal "zapper" with only 4000 buttons lets you walk around your home, magically bringing good things to life.

Unfortunately, SmartHome is already a dinosaur: a wired labyrinth with hundreds of feet of cable lurking behind the walls. It's bulky, difficult to install, and far too expensive for the average homeowner. In fact, SmartHome uses an older generation of microprocessors and really isn't so smart.

A new generation of wireless home-control gadgets is just around the corner. These gadgets are slick, tiny, and inexpensive, featuring the latest microprocessors and miniaturized circuits. These devices will spring to life instantly—when a person enters a room, when a person speaks, when daylight dawns, when the temperature drops, when night falls. The complicated zapper will be rendered obsolete by a new generation of "personal digital assistants" that respond to spoken words, the snap of fingers, the silent rhythms of morning and evening, and coolness and heat.

I can imagine that almost every conceivable item has become an electronic personal digital assistant with its own

name and probably its own voice and personality.

The question is whether the accumulation of these human-like assistants will be a homeowner's dream or a disaster. Let's peek into the living room of an average home, in late winter, sometime in the late 1990s. Enter one male human adult, theoretically the master of the household. Instantly, dozens of tiny, invisible electronic gremlins spring into action. The lights in the room blink on. The fireplace gasps, and gas-fed flames curl up metal logs. The CD player consults its built-in digital clock-calendar, notes that it is 5:00 p.m., and selects a CD filled with romantic music. The thermostat checks its program and decides that the room is a bit chilly. It cranks up the furnace and heat flows into the room.

Everything is working smoothly except for one tiny helper—the semi-intelligent home security alarm that's been caught off guard, since its schedule tells it that no one is supposed to be home on a weekday until 6:00 p.m. "Who goes there?" it booms in a threatening baritone voice.

"Just me, Butch," says the master. "I'm home early. I think I'm catching a cold."

"How do I know it's you?" asks Butch suspiciously. "What's your wife's name?"

"Margaret."

"Wrong!" says Butch, who doesn't realize that the master has remarried and forgotten to inform him. "Intruder alert! Intruder alert! Police are on their way. You have a right to remain silent or request the presence of an attorney."

Things may not get this carried away. But think of how interesting it will be if the appliances in the room not only respond to human cues but also to each other.

Again, enter the master. He sits on Catherine the Couch.

Catherine is intelligent and rearranges her shape to cushion him comfortably. The lights blink on, the fireplace blazes, and the temperature soars.

"Stop! Stop!" yells Frank the Fireplace to Thelma the Thermostat. "I'm supposed to warm the room. If you keep warming it, Ron the Room will tell my sensors to shut me off. The master wants my fire for atmosphere as much as my heat. He'll be really angry if I suddenly switch off."

Thelma the Thermostat is about to make an angry retort, but she is interrupted by Larry the Lamp. "Shut up, Frank!" cries Larry, who is very rude for a lamp. "You don't have any real heat; you're just for show. And take a look at the master. He's got a book in his hand, so he must want to read. Lighting the room for reading is my job."

As the other appliances hear the argument, they join in. Stan the Stairway begins complaining to Ruth the Rug. Catherine the Couch unwinds at Tubby the Table. Wendy the Window starts whining at Dora the Doorknob. Pretty soon, the entire room is filled with the screams and shouts of disgruntled appliances.

In the middle of the room, the master has been dumped on the floor by Catherine, flipped on his back by Ruth, left in the dark by Larry and Frank, and frozen by Thelma. He starts to complain. But his tiny human voice is drowned out by the taunts and threats of the incensed appliances.

This story's moral: It's fine and magical to bring good things to life. Soon, we'll have the technology to do this inexpensively for almost every device in our homes. But maybe there's a limit, beyond which we wave bye-bye to common sense and sanity and say hello . . . to the twilight zone. □

## Beyond Multimedia: Upside-down TV

by Fred D'Ignazio

**Multimedia isn't about ever-more-stimulating television; it's about choice, diversity, and learning.**

Over the next four months, *The Multimedia Sandbox* will move beyond multimedia to focus on the appropriate use of technology. Earlier versions of these four Beyond Multimedia articles appeared in the University of Central Florida's *Connections* magazine.

### What Is Multimedia?

"Multimedia" means the digital (i.e., computer) transformation and control of multiple media, including voice, music, sound effects, printed text, still images, video, and animation. Multimedia is the marriage of computers and television. It is the fusion of information and communication. Its effect will be chiefly economic as whole industries collide and converge, producing a single electronic mega-information industry of the future.

But "multimedia" can be a misleading buzzword.

We should be skeptical of the term "multimedia" and think of it as a rough approximation, a way of taking a blurry snapshot of a swiftly moving locomotive. The subject is not the snapshot, nor is it the locomotive. It is the process of change itself as we rush from a static print-based representation of knowledge to fluid, electronic representations of knowledge.

We should think of learning in the future as a "sensory collage" designed to reach us on all our learning modalities. Are we a kinesthetic learner? A visual learner? A linguistic learner? No matter which way we learn, multimedia will reach us as "windows of learning" (sounds, images, charts, maps, narrative descriptions, movies, vignettes, snapshots, sketches, etc.), constantly refreshed with new

electronic data generated from original sources at home and around the globe, then piped into our homes, offices, media centers, and classrooms along electronic highways.

The marvel is that these new windows of learning will be opened to us on a commonplace desktop computer. Simply by clicking a mouse, talking into a computer microphone, or touching a screen, we will open windows that offer us unparalleled opportunities to engage our students as active participants in classroom learning.

### Beyond Multimedia

The key is to focus our sights beyond multimedia. Let's try to think beyond multimedia to simple steps we can take to begin using information in new formats in today's classrooms with today's students.

Forget *multimedia*. Think *monomedia*.

The very term "multimedia" sounds intimidating. Somehow we are led to believe that in order to be "Multimedia Correct" we need to present information using *all* media simultaneously—not just text but sound, graphics, animation, and movies, too! We are told that classrooms of the future will resemble Hollywood studios equipped with video cameras, switchboards, mixers, CD players, computers, TV's, laserdisc players, digitizers, microphones, fiber optics, and hundreds of cables, buttons, and blinking lights.

This is silly. Multimedia doesn't mean the simultaneous application of all media in all situations. This is *blind* media, a kind of "nuking" our kids with media. Rather we should think about the *appropriate* use of media in the classroom, since this is what it is really all about. One day soon we will be able to choose the appropri-

ate media to convey any subject in our curriculum. It will be simple, easy, and cheap to call up sounds, images, movies, text, and so on. Then it's up to us to decide *which* medium is appropriate to help meet our learning objectives. Maybe it means a single medium. Or maybe two or three media used judiciously and harmoniously to support each other.

### Media to Think With

Why should we use media at all? Because media can become a tool for the active construction of knowledge.

The key is to slow things down. Any time we "blitz" students with too much sensory input and don't allow time for reflection, discussion, analysis, and digestion of information, we are using media inappropriately and turning the classroom into a training ground for brain-numb couch potatoes.

How can we slow things down? We can do this by managing media judiciously. We can train our students to use media in small, meaningful bites, rather than as a smorgasbord of "all you can eat."

In the classroom this translates into using one medium at a time. For example, we can wheel in a videodisc player and let students deliver oral narrations of their writing while they display images or play short musical or spoken clips to illustrate their work.

Or we can use a CD-ROM encyclopedia to project charts, maps, or photographs to illuminate concepts that seem abstract when expressed only as words.


Or we can use a video camera to record concrete events, people, places, and effects, in order to make learning less remote, fuzzy, and unreal.

The key is to use media in short spurts, then switch immediately to periods of classroom discussion, writing, and critique. We want to use media to stimulate thinking not overwhelm it. You can accomplish this by presenting a few sound bites or video bites, then reserving plenty of time for students to think about what they have seen and heard. They need time to write down their thoughts. They need time to discuss their interpretations, their observations and conclusions. Give them time to modify and rework their thinking into a personally meaningful pattern.

### KISS: Keep It Simple to be Successful

Remember, before you get panicky about managing a multimedia classroom of the future, scale things down. Keep it simple. Dole your media out sparingly. Provide lots of thinking time, writing time, and discussion time. Remember:

A little media goes a long way.

In summary, multimedia is mostly what we make it. It will soon be so easy, so cheap, and so quick to use media of any sort that we will be able to pick and choose among any combination of media that we like. It is up to us to transform multimedia into "appropriate media" and "common sense media." 


[Fred D'Ignazio, 4121 Okemos Road, Suite 24, Okemos, MI 48864.]

### Research Windows

*continued from page 7*

needed. If a teacher wants to support cooperative learning and/or constructivist thinking, for example, programs and curriculum that support this type of technology use are needed.

The use of a sequenced approach to mathematics learning that moves from concrete materials through visualization and student communication to the use of computer tools is exciting. The answer is not manipulatives or computer tools, but both and more, including lots of imagining, writing, and talking about mathematics.

Research that looks at students using computer tools and examines the complex variables interacting with learning in classrooms seems especially promising. Char's discovery of how young children touch computers while thinking is important information for hardware and software designers. Researchers are learning that more might be learned by asking the learner than by just measuring achievement with one-dimensional paper and pencil tests. 

[Kärin Wiburg, College of Education, Box 30001, Dept. 3CUR, New Mexico State University, Las Cruces, NM 88003.]

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### Technology and the At-risk

*continued from page 26*

communicate with students in classrooms worldwide gives a sense of global connection and provides a better perspective on their individual lives.

### Conclusion

There seems to be a set of strategies that work well in keeping at-risk students in school, provided such students have been properly identified. Whether they are at-risk because of cultural differences, language barriers, mental or physical handicaps, or socioeconomic status, an effective way of educating such students must be characterized by stimulating instructional programs and the use of all available resources, including educational technology. Building on different learning styles and individual strengths as well as early systematic attention to needs and counseling are also strategies that motivate students to finish

school. It is important to try to reach every at-risk child. Each dropout represents a life whose full potential will not be realized. 

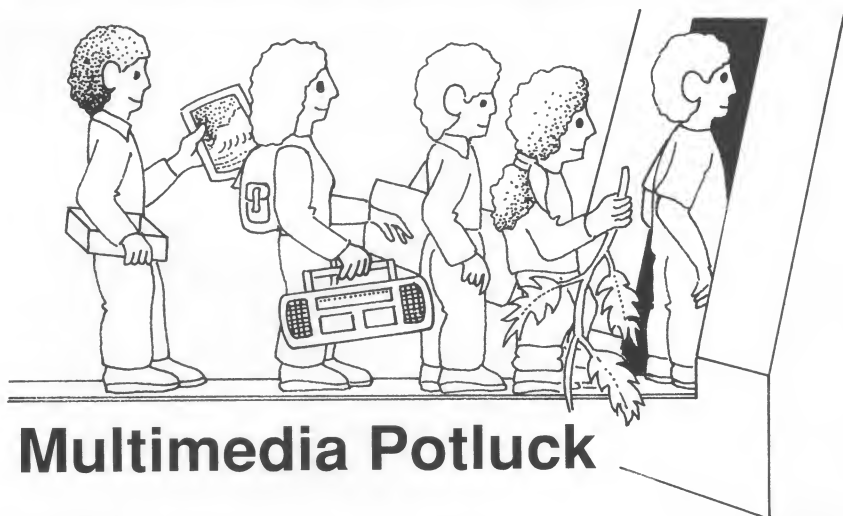
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## Multimedia Potluck

by Fred D'Ignazio

A hodge-podge of curriculum materials can become a delicious multimedia “dish” with the use of computer imagery.

When three science teachers from Dowagiac Union Schools in Michigan came to my multimedia workshop recently, they brought lots of raw materials to make their own multimedia lessons. They brought pages of leaves from their leaf collections. They brought their bug collections. And they brought their *Encyclopedia of Animals* videodisc collection from Optical Data. As soon as they arrived at my workshop, the teachers got busy making things:

- They propped their bugs up on a music stand and used a video camera to scan color images of the bugs into the computer.
- They put pages of leaves face down in my Howtek Personal Color Scanner and created beautiful, full-color computer images of their leaves.
- They used my color and gray-scale hand scanners from Logitech to capture photographs they had brought in from manuals, guidebooks, and personal photo collections.
- They captured sounds from audio CDs—surf breaking on the coast in Cape Cod; fierce, crashing waves in a chilling winter storm; soft sounds of water lapping on a creek bed; wind whistling through trees; leaves flapping and crunching in late fall; bugs humming and buzzing.

The teachers brought these materials from their “teacher drawers” and “teacher closets.” They were science specimens and slices of the real world that spiced up children’s lessons and brought a tired, dusty curriculum to life.

### Multimedia Stew

In my workshop, the teachers learned how to use three programs—*LinkWay Live!*, *Multimedia Desktop*, and *VideoShop*—to stir these ingredients into a rich multimedia stew—filled with sounds, captions, still images, video, and background music. Next they took turns collecting teacher-video bites of their colleagues—tiny video and audio clips of each teacher explaining key concepts or describing the specimens they had brought. We captured the video using the Video Spigot board from SuperMac and the ActionMedia board from IBM.

We turned the tiny teacher “factoids” into pop-up video windows on the computer screen.

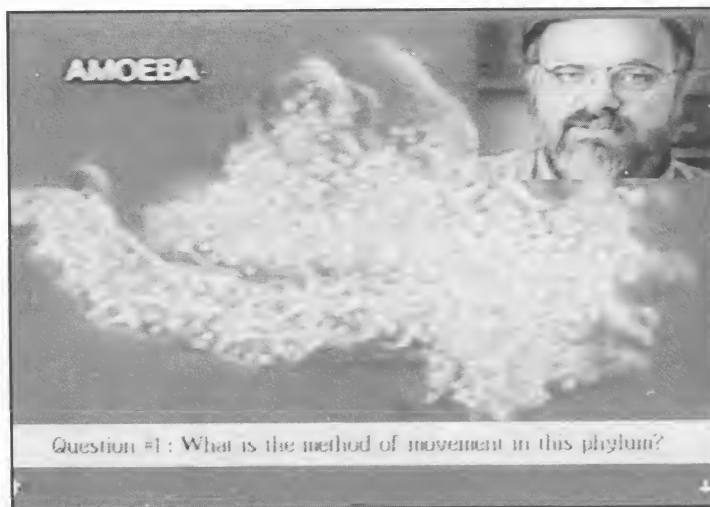


Figure 1.

We wove the windows into a mini-tutorial and a pop quiz on invertebrate animals such as the amoeba, the volvox, and the vorticella (Figure 1).

### Aspiring Chefs in a Multimedia Kitchen

I think of my multimedia classroom as a “kitchen” for aspiring multimedia chefs. Teachers and students bring a hodge-podge of “potluck” curriculum materials to my kitchen, and I teach them how to cook up a delicious multimedia “dish.”



Figure 2.

What kinds of ingredients does my multimedia recipe call for? Almost anything will do! Teachers come to my workshops hauling boxes of stuff, including:

- Old photos
- Leaves, bugs, fish, etc.
- Textbooks
- Crafts, sculptures
- Paintings
- Children's pictures, art
- Souvenirs
- Fossils, rocks, tree branches
- CDs, tapes, videos
- Musical instruments
- Library books
- Buttons, stamps, cards

In my multimedia workshop, I show my apprentice chefs how these ingredients from the real world add sound, color, and moving images to their lessons. I encourage them to take this same "cookbook" approach back to their classrooms to make classroom learning more *meaningful and exciting*.

### The Human Fraction

In the multimedia kitchen, two of the most important ingredients are your body and your imagination!

Recently, I worked with a classroom full of math teachers. What does math have to do with multimedia? A lot, really, when you remember that most children—and most adults—are math-phobic because they can't visualize math concepts and can't apply math rules and symbols to everyday problems. Multimedia can help make math real for children by making math multi-sensory (with images, sounds, music, etc.) and by letting

children use their bodies to simulate math concepts and story problems.

I challenged my math chefs to cook up some math concepts using only their bodies and the tables and chairs in our classroom. Over the next hour of the workshop I was amazed at all of the ingenious—and hilarious—concoctions that the chefs dreamed up, including:

- A human fraction ("3/4") consisting of three math teachers kneeling on top of a table and four kneeling underneath a table.
- A moving equation of "sets"—teachers rushing in and out of groups based on their ages, heights, gender, grades taught, and big numbers they wore on their name badges.
- A human graph made up of three teachers of ascending height holding up a fourth (skinny) teacher demonstrating a bar graph and a line on the graph with a positive slope.

Each time a team of chefs presented their math concept, we pointed a video camera and captured the concept as a still image inside the computer (Figure 2). We entered a computer paint program and typed in captions and arrows. And we digitized a math teacher's voice feeding students clues and challenging students to identify the concept correctly.

### Fast-Food Multimedia

So now's the time to start imagining: What kind of multimedia potluck could you create? What kind of multimedia dish would it be fun for you to cook up? What special sights, words, and sounds can you combine that will bring a subject you love to life? You might have the potential to become a gourmet multimedia chef, or at least a short-order cook at a multimedia fast-food restaurant.

[Fred D'Ignazio, *Multimedia Classrooms, Inc.*, 4121 Okemos Road, Suite 24, Okemos, MI 48864.]

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# Authentic Publishing in a Classroom Without Walls

In my recent columns I have pointed to the outdated images we grown-ups have about technology and how we have unwittingly incorporated these misconceptions into all our thinking about how to use technology in our schools.

In this month's column I describe a new path teachers can follow that is more student centered and less expensive, and that honestly recognizes technology for what it is. The basis for this column is a telecourse called Teaching and Learning with Technology, which I taught for the state of Florida.

## Creating a Technology Cookbook

Last year I created a year-long telecourse for teachers in Florida who were beginning to use technology in their classrooms. The philosophy of this course was to view technology as a problem rather than as a solution. When viewed as a problem, technology offers a powerful environment for students and can improve their skills in the following areas:

- problem solving
- creativity and ingenuity
- innovation
- collaboration
- coaching, tutoring, and apprentice teaching

The core of this approach involves having teachers organize students into writing teams that take responsibility for technology. Some of the students' responsibilities include:

- scavenging (acquisition)
- inventory operation
- troubleshooting
- security
- training

Student writing teams boil down the chaotic flow of technology into small, manageable procedures known as "recipes." They create miniature, customized manuals about the technology in their classroom or media center and focus exclusively on the elements they and their classmates need to master to do their daily classroom lessons.

After the student writing teams are formed, the students become a web of "one-minute gurus"—a distributed network of helpers, tutors, and problem solvers who can tame technology in their classroom and make sense of new technologies as they appear.

The student writing teams take the place of the grown-up gurus who are stretched too thin in most districts to provide deep, constant, on-demand aid to a teacher struggling with technology. As one-minute gurus, students collaboratively support and buffer the teacher from the stress, frustrations, and time-consuming demands of technology.

The student writing teams assume responsibility for current and new technologies in the classroom by carrying out 11 different tasks:

1. Inventory classroom technology.
2. Inventory "borrowable" equipment available at their school building or at home.
3. Design research, authoring, and publishing minicenters.
4. Scavenge pieces of the minicenters from home and school.
5. Construct the minicenters from the scavenged equipment.
6. Create a sample curriculum-based project using the minicenter.
7. Write a recipe—a "how-to" guide that helps others create projects.
8. Test the recipe on fellow student "test pilots."
9. Train the teacher to use the recipe successfully.
10. Incorporate the recipe into a classroom cookbook of recipes.
11. Return to step 1 periodically to incorporate new technology, new minicenters, new projects, and new recipes into the class's research, authoring, and publishing resources.

## Make Your Classroom an Innovation Center

To help you transform your classroom into an "innovation center," here is a more detailed description of the 11 steps. An innovation center is a system that constantly renews itself through learning. (For more information on this concept, see Peter Senge's (1990) masterful book, *The Fifth Discipline*.)

A student writing team is the chief tool a teacher uses to help students learn new technology. The teacher must practice managing this tool efficiently in order for the classroom to become an innovation center. In an innovation center, new technology is always welcome and there is a means to incorporate technology quickly and smoothly into students' learning activities.

Student writing teams keep on the lookout for new technology at home and at school. As soon as team members notice anything new that might be "scavenged" for the classroom, they notify the teacher. With the teacher's permission they bring the new technology into the classroom and log it into the classroom's technology inventory.

Here are the following steps that student teams follow to make each new technology available for teaching and learning:

1. The teacher and students plan new minicenters out of scavenged equipment, trying to match the minicenters to curriculum projects and students' learning styles. Students maintain an inventory log as a three-ring notebook or database of resources on the computer.
2. The teacher assigns a student team to manage a specific minicenter.
3. Teams set up the minicenter using new or scavenged equipment.
4. Teams create a sample product using the minicenter.
5. Teams write up a "recipe" describing how they created the product. (A future column will describe the recipe-making process.)
6. Teams observe other students ("test pilots") as they use their recipe.
7. Teams repeat step 6 as often as necessary, debugging their recipe to make it clearer, easier, and more effective.
8. The recipe must be improved until at least three student test pilots are willing to sign a form saying they think the recipe is clear, helpful, and easy to understand.
9. Teams submit their recipe to the teacher for final testing.
10. The teacher tests the recipe and, if necessary, returns it for more debugging. If it meets acceptable standards, the teacher authorizes its addition to the classroom "cookbook" (the three-ring binder). The cookbook is a collection of approved recipes for all the centers.
11. Students type up a final, clean draft of the recipe and insert it in the cookbook. The recipe is signed by all team members to show their responsibility for the recipe.
12. The teams publish an enlarged recipe "poster," which they hang over their minicenter for others to see and use.
13. The poster lists the names of the students on the team who are the minicenter's official "experts," "coaches," or "trainers."
14. Each team member is now individually responsible for answering other students' questions and for helping them come up to the team's level in operating the center.
15. All team members enter the minicenter recipe into their own portfolios.
16. Each team member can add the operation of the center to the list of skills included on a self-published personal business card. Team members revise their business cards and hand them out so that other students know whom to call for help in operating a particular minicenter.
17. Teams conduct an inservice tutorial and recipe "walkthrough" for the entire class or for other teams.
18. The teacher videotapes this tutorial as part of an assessment of the team's work.
19. Team members can add portions of the teacher's tape to their portfolios.
20. Students are responsible for organizing monthly parents' nights, in which the students train their parents to use the minicenters and/or publishing stations. Parents complete some kind of take-home publication as proof that they have learned a skill from their child. Parents sign their child's Recipe Page in the cookbook as proof that they acted as a test pilot for the recipe and that the recipe worked!

### Until Next Time ...

That's it for this month! In next month's column, I will offer some tips for teachers and student writing teams and provide some schedules, templates, lists, and examples to help teachers and students get started on using this methodology. Please write me or e-mail me to give me feedback on this approach. Thanks! ■

[Fred D'Ignazio, Multi-Media Classrooms, Inc., 4121 Okemos Road, Suite 24, Okemos, MI 48864-3220; dignazio@msen.com; 517/349-1340 or 517/349-3657]

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# *The Technology Administrator's Field of Dreams: Build It and They Will Come*

I've been out visiting schools around the country, and I've noticed that we are following the same cycle of "adoption" with the information superhighway (the Internet and so forth) that we followed with older technologies that just a few years ago were the latest and the greatest thing since sliced bread.

The basic cycle has five steps:

- Step 1. You hear about it.
- Step 2. You go gah-gah.
- Step 3. You buy it.
- Step 4. You install it.
- Step 5. You wait for miracles to happen.

I call it the Field of Dreams technology plan: "Build It and They Will Come."

The notion behind this strategy is that technology is so inherently good and important that if we just acquire the boxes, build the infrastructure, or get Internet accounts for all the teachers and students, they are just going to love it. And teaching and learning will never again be the same.

Unfortunately, this is a technology enthusiast's dream world. It's a lot like the story of the engineers from an instant-camera company. These techies were infatuated with a transparent, see-through camera that showed the film being developed. They convinced their bosses that American consumers would be similarly enthused. The instant-camera company mass-produced the camera, but it flopped. Watching film develop was super-cool for engineers, but to the average consumer it was a nonevent.

## **A Box-Centered View of Technology**

In his landmark book *Teachers and Machines*, Larry Cuban chronicled the way a small cadre of educators have embraced new technologies over the past 100 years and looked to these technologies for educational salvation. Record players, movies, radio, the telephone, TV, computers, and even the chalkboard were all at one time the sub-

ject of glowing reviews by technology evangelists.

What Cuban revealed was the technology enthusiast's "box-centric" notion of technology and our belief that smaller-cheaper-faster-better boxes can become a solution to instruction. As a group we are on the lookout for the perfect teaching machine that will deliver the benefits that automation promises, i.e., better instruction at a faster speed, lower cost, less hassle, and less sweat.

So we go out there and buy boxes. Boxes and more boxes.

"Sure, it's a nightmare today," we tell teachers, as we try installing the stuff in their real-world classrooms. "But just you wait: This stuff's the future. Before you know it, it will soon be the perfect, one-button appliance."

It feels like modern times so we forget that, as Cuban points out in his book, we have been doing this same thing over and over for almost 150 years.

Now we find ourselves employing this same thinking when we look at the new emerging technologies, including multimedia, virtual reality, telecommunications, two-way cable, video dial tones, fiber optics, digital satellite, the Internet, and wireless personal communicators.

Last night I spoke at a dinner discussion at a national conference attended by technology coordinators from the largest urban school systems in the United States. I was struck at how the discussion among these educational leaders and policymakers revolved around boxes: the cost of boxes, ways to fund the acquisition of boxes, the installation of boxes, the functionality of boxes. Frequently, I had to pinch myself. I felt as if I had taken a wrong turn in the hotel lobby and was not at a conference for educators. Instead, I felt like I was at some kind of hardware convention!

Our box-centric frame of reference for educational technology is understandable because it is a popular frame of reference for all humans vis-a-vis all machines. Unfortunately, it carries with it a couple of corollary "killer dreams" that are invisible yet crippling to many of our expensive and well-intentioned efforts to make technology usable and useful to our students and teachers. For

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**The notion behind the Field of Dreams strategy is that technology is so inherently good and important that all teachers and students are just going to love it. And teaching and learning will never again be the same.**

---

By Ann C. Penn

Photos by Dale Pearson



Fred and Janet D'Ignazio have two children and about 20 computers.



Eric, five, directs the family robot.

# The D'Ignazios' "Electronic Hearth"

## ROANOKE'S FIRST FAMILY OF COMPUTERS

"Goodnight, Apple . . ."  
"Goodnight, PC . . ."  
"Goodnight, Commodore . . ."  
"Goodnight, Macintosh . . ."  
"Goodnight, Atari . . ."

An updated version of the old "Waltons" closing?

No, a new twist on the familiar children's story, "Goodnight Moon." When Janet and Fred D'Ignazio read it to their children—Catie, age 8, and Eric, age 5—the goodnights are not only to stuffed bears and dolls but to the more than 20 computers and robots that inhabit the D'Ignazio household.

**T**he D'Ignazios are Roanoke's "First Family of Computers." Roanoke's All-American computer family. Visitors are greeted in the living room by TOPO, a small robot. Computer monitors and keyboards line desk-height shelves in almost every room of the house. Lap computers are available for use in the bathtub. The attic serves as a graveyard for half-assembled and outdated machines.

A nationally recognized author of children's books and media expert on

computers, Fred dates his interest in computers back to 1970 when he used one to analyze information for his Master's Degree in international relations. His professors were impressed and he was hooked.

"I've always had a fascination with machines, but not as a do-it-yourselfer. I was hooked when I realized that a machine

### Seven Reasons Not To Buy A Computer

1. To balance your checkbook
2. To file your recipes
3. To organize your life
4. To write letters to your friends
5. To program it—nobody does
6. To impress your friends
7. To use as a coat hanger, art object or dust collector

toys are available.

"At our house, the playtime or story hour before bedtime is called 'dark stories,'" says Janet. "From when Catie was very little and Fred used to turn off the lights and tell her stories before she fell asleep. Now, the children have their choice of activities at that time of the day. They can choose to read stories, play with other toys or play with the computers. They probably average about three nights a week on the computers. But weeks go by when they're not interested and then they play with them every night for a week."

Both parents tell stories of their children's use of computers that debunk common myths about kids and computers. For example, rather than take away her

## Hardware and Peripherals

**F**red D'Ignazio recommends buying a computer that has been out for several months and has sold more than 100,000 units as a guarantee against obsolescence. The following computers all have sold in large numbers: Commodore 64, Apple II (e or c), IBM PC or PCjr., Atari 600XL or 800XL, Radio Shack Color Computer.

Try to get a disk drive. Tape drives are difficult for young children to operate and frustrating and time-consuming for adults. Although a disk drive costs between \$200 and \$300, it is worth it and pays for itself. It is much simpler to use and stores information faster.

Many new computers come with cartridge slots. Cartridges are even faster and easier to use than disk drives.

Keyboard replacements are a great new development. Instead of using the keyboard to operate the computer, children work on a large pad that looks like a chalkboard. Keyboard replacements can be used with more than one program. D'Ignazio recommends Koala Pad from Koala Technologies (approximately \$100, including an electronic finger-paint program), Power Pad from Chalk Board (also \$100 with some software built in) and Atari Lab (an attachment that allows children age 10 and up to conduct science experiments, about \$80).

incentive to read, the computer gave Catie an extra boost in her reading efforts.

"Catie wanted to play a particular computer game that all the other children were playing," says Janet, "but she needed to read in order to follow the directions. I'm sure that she was ready to read, but playing the game gave her that extra push to get started."

The computer also can provide a source of imaginary fun. Eric often uses the computer as another element of fantasy

*Continued on page 49*

# Fred's Software Tips

*Here is a list of recommended programs from Roanoke computer expert, Fred D'Ignazio.*

- ENTERTAINMENT** (does not include 7th grade and up)
- shoot-'em-up video games)
  - Match Wits (CBS Software)
  - Murder by the Dozen (CBS Software)
  - Pinball Construction Set (Electronic Arts)
  - Load Runner (Broderbund)
  - Deadline (Infocom)
  - StarCross (Infocom)
  - Infidel (Infocom)
  - Planetfall (Infocom)
  - Space Shuttle Construction Set (HesWare)
  - Music Construction Set (Electronic Arts)
  - Movie Maker (Interactive Picture Systems)
  - MusiCalc (Waveform)
  - Song Writer (Scarborough)
  - Picture Writer (Scarborough)
- College Prep Courses**
- SAT programs (Krell, Harcourt Brace, etc.)
- EDUCATION**
- Pre-school through 2nd grade*
- Juggle's Rainbow (The Learning Company)
  - Bumble Games (The Learning Company)
  - Alf in the Color Caves (Spinnaker Software Company)
  - Ranch (Spinnaker Software Company)
  - Kids on Keys (Spinnaker Software Company)
  - Turtle Toyland (HesWare)
- 3rd through 7th grade*
- Troll's Tale (Sierra Online)
  - Dragon's Keep (Sierra Online)
  - Rocky's Boots (Spinnaker Software Company)
  - Adventure Creator (Spinnaker Software Company)
  - Delta Drawing (Spinnaker Software Company)
  - Factory (Sunburst)
  - Missing Links (Sunburst)
  - Reader Rabbit (The Learning Company)
- The following available only for Radio Shack computers:
- Learning with Language (Children's Television Workshop)
  - Hands on Your Computer (Children's Television Workshop)
- PROGRAMMING LANGUAGES**
- LOGO (up to 3rd grade)
  - BASIC (4th grade and up)
  - PASCAL (College prep—this is the language for the Advanced Placement Test)
- WORD PROCESSING**
- The Write Stuff (Harper & Row Software)
  - Bank Street Writer (Broderbund)
  - HomeWord (Sierra Online)
- HOME MANAGEMENT**
- Multiplan (HesWare)
  - Home Accountant (Continental Software)
  - Tax Advantage (Continental Software)
- FILING**
- Phi Beta Filer (Scarborough)
  - PFS: File (Software Publishing Company)
- Note:* In addition to the software, you will need a modem to tie into a data base. Available from the computer company or Hayes Corporation. Cost—\$300 and up.
- LEISURE LIFESTYLE**
- Aerobics (Spinnaker Software Company)

## Tips on Shopping for a Computer

- Don't just look for deals! Good support after you buy a product is the most important consideration. You will need the backup of someone local who knows you as a customer. It doesn't do you any good to save \$50 to \$100 if there's no one to help you when you run into problems at home.

- Don't look for the computer first. Look for the software. Decide what you want a computer to do. Think applications and activities in the form of software. Once you find the software you want, find out which computer will run it. Some pieces of popular software have been adapted for a variety of computers, but that is not true for all soft-

ware.

- When you have found everything that you want to buy, ask what kind of support the store offers. Can you return the computer if you have a problem? Can you have your computer set up in the store before you take it home? Then go over every little switch. One couple stayed up until 2 a.m. because they couldn't tell from the manual how to shut off the machine.

- Find out if the store offers a simple beginner's course. At this point you aren't looking for a programming course—but instruction on how to operate the machine and use the programs you have purchased.

# Why Do Over 30,000 Homeowners in Roanoke Choose Gas?

## ○ Economy. Efficiency. Dependability.

Compare natural gas to other energy sources, and you'll find natural gas to be less expensive, more efficient and more dependable than other acceptable energy sources.

Overall, that spells more comfort for you, as well as the confidence of knowing that a courteous serviceman is only a telephone call away—night or day—if you ever need help with any gas appliance.

That's why for over 100 years Roanokers have chosen gas to warm homes, heat water, dry clothes and cook their food.

Call us about your plans for new

construction—or the replacement of older equipment—and we will show you how easy it is to bring the advantages of natural gas to your home or business.

ROANOKE

COMPANY

○  
Since 1883

## Computers

*From page 49*

to use the computer together."

The computer is a powerful technology that can be used for good or harm. Fred sees himself as a thinker who has an opportunity to communicate his views of the healthful, constructive ways that computers can be used with children.

"The real question is how people relate to machines on an individual basis. Are they enhancing your life, making you happier and healthier or are you becoming more like a machine? I am very fearful

## Why Should Your Family Buy a Computer?

### Computers for Children

A computer is a wonderful educational toy. According to D'Ignazio, all home computers should be looked at as toys and not taken too seriously.

### Computers For a Business In Your Home

D'Ignazio rule of thumb: *Don't take an 18-wheel Mack truck to the grocery store to buy a quart of milk.* Ask yourself if you can do the task less expensively or more easily without a computer. A computer can actually be extremely inefficient for certain jobs. Computers are ideal for managing a lot of information or word processing—for doing jobs like writing numerous paychecks, keeping voluminous files, writing frequent and formal correspondence.

### Computers For Entertainment

People are bored with video games. The new generation of computer games on the horizon involves the players as participants rather than as spectators. These games are simulations of adventures like space shuttle missions and photographic safaris. Each adventure has a strong educational component stressing reading, logical thinking and problem solving, but the educational aspects are hidden in the entertainment. These games are not designed just for children.

of a future when we are surrounded by machines and we let them call the shots, use them as crutches instead of using them as toys. That's why I think that it's very important for parents to put computers into perspective. It's critical that we teach our children both computer manners and computer ethics. If we see a breakdown of ethics as a result of a computerized world, it's because we have reneged on our responsibilities."

*Ann Penn has covered business in the Valley for The Roanoker, Pace, and other publications.*



Multi-Media Classroom's *The Voice Studio*  
New Product Test Plan  
May 20, 1993

Project Team:  
Lauren C. Pfeiffer  
Fred D'Ignazio  
Chris Bendall  
Joanne Dunn

**Design Outline**

**Title of Product:** Multi-Media Classroom's *The Voice Studio*

**Primary Users:** Classroom Teachers and Students (age 8 and up)  
School Library Media Specialists  
Public Library Media Specialists/Visitors  
Consumers/Families

**User sites:** School or Public Library  
Community Centers and Public Sites for Learning Programs  
(e.g museums)  
Homes

**Technical Development Goal:** to create an environment which enables learners to interact with the expressed ideas--the recorded voices--of people from 1890 to today. This interaction includes listening, copying extant voices, recording new voices, and scripting dialogues around themes and topics of the user's interest.

**Educational Goal:** to engage learners in the production of and participation in "virtual" dialogues that support: collaborative inquiry across a wide range of subjects, the development of critical thinking, and the creation of unique literacy experiences including listening, speaking, reading, and writing.

**Organizaton of Content:**

**•Database of voices**

Retrievel can be organized by: Names, Events,Time, Theme/Topic, Key Words.

Retrieval appears in two forms:

**1. Name that Voice--Know that Person**

In a mystery game format, users can call up a set of voices that are clustered according to particular criteria (e.g. theme: sports) and the voices will be displayed in a collection of faceless profiles (see storyboard screen # 1.) The user can click on each profile, hear the voice, and try to identify the speaker with the help of their collaborating partners, outside reourses, and/or the voice studio tools. They can then continue exploring biographical information and additional recordings connected with the targeted speaker.

**2. Database search and copy and record**

This format is a traditional database organization of all voices stored on the CD. Users can call up a set of voices that are clustered according to particular criteria (e.g. alphabetical; or time period-1970's) and the voices will be displayed in a listing of name buttons that are linked to the voice and a scrolling text display of what the speaker says (see storyboard

screen # 1a.) Any part of the text/voice can be searched, copied, and pasted into a dialogue script that the user is creating or recorded onto an external cassette for transferable uses away from the system.

### •*The Voice Studio*

This is the central and unique feature of this product. Users will be guided in searching, copying, recording, and sequencing voices from the database into a scripted dialogue that they design. They will be guided in how to record and add to this dialogue (e.g. an interview, conversation, debate, panel presentation), their own voice and the voice of others (see storyboard screen #11.).

For example, a fourth grader might script an interview with John F. Kennedy in which he and his grandfather ask questions of JFK and JFK responds from the voice database. Additionally, the student may record her conversation with her grandfather as he tells a story from his recollections of JFK. She can then script these voices into a virtual interaction among the three of them to share with classmates, to incorporate into a larger project, to use as the centerpiece to her own writing.

As another example of learners using this studio to bring into real time the idea and voices of people across decades is a high school student who structures a debate around the issue of Racism: Are we making any progress? He can bring to the table a set of voices and diverse views, traditionally separated by time. The user, along with his/her contemporaries (classmates, parents, local experts) can participate in this debate.

### •**Toys and Tools:**

At any point in the program, the user can:

-call on a team of "pop-up" consultants to guide their exploration or production.

This team includes:

- ✓ Multi-media Wizard
- ✓ Teacher/Facilitator Consultant
- ✓ Experts--Producers, Editors, and Hosts of television and radio news/talk shows
- ✓ Kids as guides in how to create and participate in dialogues in *The Voice Studio*

-enter the voice laboratory where they manipulate the audiotrack and explore the sound qualities of a selected voice. For example, users can slow the voice down, change its intonation (make it sound like Alvin), and actually see the sound waves.

## **Functional Specifications**

### **Product Content:**

- 150-200 of recorded voices from the Voice Library, Michigan State University
- sorting THEMES/TOPICS for the voices will include:

- ARTISTS
- ATHLETES
- CARTOONISTS
- CHILDREN
- COMEDIANS
- ENTERTAINERS
- ENVIRONMENTALISTS
- HISTORIANS
- INVENTORS
- JOURNALISTS

- AUTHORS
- MATHEMATICIANS
- MUSICIANS
- NEWSCASTERS
- POLITICIANS
- PSYCHOLOGISTS
- SCIENTISTS
- WAR VETERANS
- WRITERS

### **Product Components:**

Hardware: IBM Microcomputer and Monitor/ 1MB/ Mouse  
 CD ROM (internal or external)  
 SCSI Cable  
 SCSI computer interface/card  
 External powered speakers/speaker cables

Audio Support (one of the following):

ACPAcard;  
 M-audio card; or  
 Digispeech #201a adapter

Software: LinkWay Live!

Optional:

(For Learner Input): Microphone/cable/and 1/4 in. phone jack

(For Learner Output): Audio cassette recorder/cable

Set-Up: Standalone workstation (classroom or library)

Networked workstation ( to be incorporated into later versions of product)

### **Plans for Development and Testing**

Tasks:

- Confirm theme/topics for sorting voices in the studio
- Finalize selection of all voices to be used in Vol. 1 of *The Voice Studio*
- Finalize graphics, extant and generated to be used in *The Voice Studio*
- Program *The Voice Studio* engine in LinkWay Live!

### **Formative testing of *The Voice Studio***

Members of the The Voice Studio Advisory Board will seek input and conduct formative tests of partial components of system with small groups (4-5) of primary users across sites. For example, students are being interviewed for input in which voices to include in Vol 1.

### **Beta testing of *The Voice Studio***

To begin 9/30/93--The delivery of the beta test software to the Technical Coordinator is later than stated in original schedule (9/13/93) so that formative testing can take place in classrooms at the start of the 1993-94 school year.

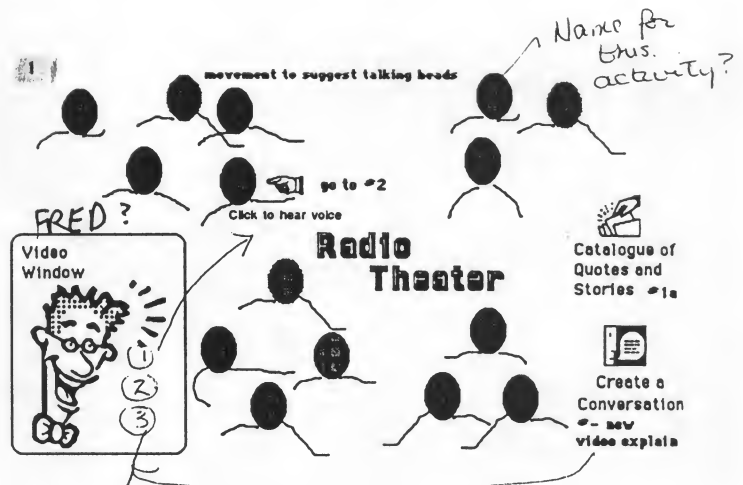
### **Summative evaluation of *The Voice Studio***

Results of Formative testing, Beta testing (by technical coordinator and in primary user sites) will be used to create later versions of Vol. 1 and subsequent volumes of *The Video Studio* .

## Intro screens/video

A conversation of Fred, Lauren, Maury, Dan, ....etc.  
about what they want to do with the Voice Library.

- 2 1/2 Reebok Commercial where designers are talking
- Conversation about learning + kids + key (RT) Design Criteria
- Eavesdropping



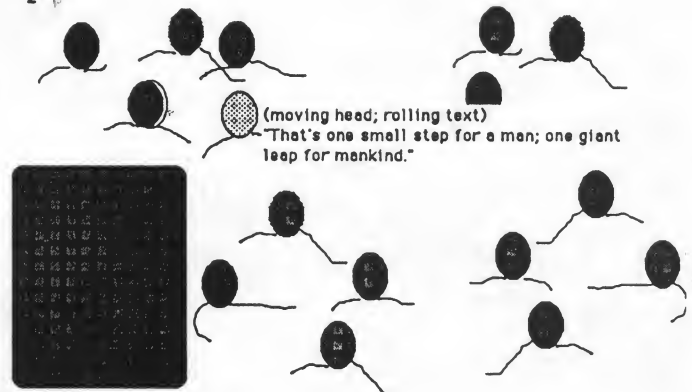
## 1a Catalogue of Quotes and Stories

- New Button
- New Button
- New Button
- New Button
- New Button
- New Button
- New Button
- New Button
- New Button
- New Button

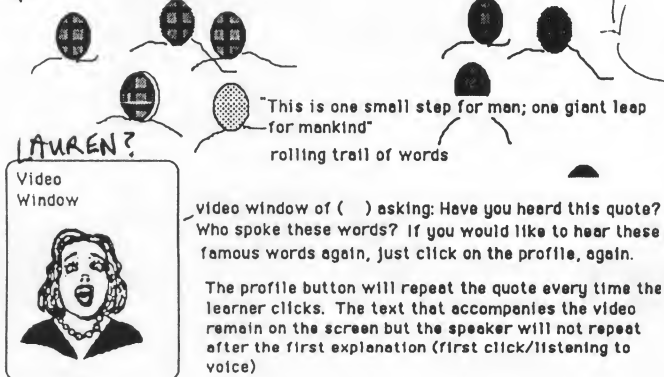


Return

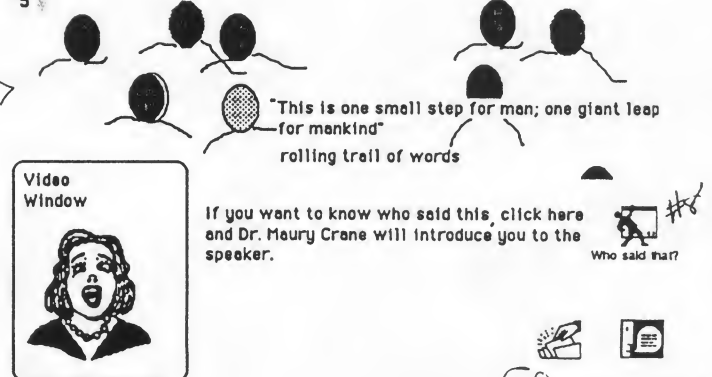
2



4



5



Have been explained

## Box/Packaging

Voice Studio - Picture:

1. Table w/ People

2. Microphone hanging down

3.

# PROPOSED *Voice Studio* DESIGN GUIDELINES

By Fred D'Ignazio  
June 14, 1993

## SUMMARY

1. VS becomes an entertainment product primarily and educational product only secondarily. (More like Carmen San Diego series.)
2. VS is designed exclusively for kids. Adults can use it, but it must succeed, right from the start, with the idea of a kid sitting down and getting entertained and interested *immediately*.
3. VS is accompanied by a narrative popular-culture book -- Suggested title: *Modern Times*. It's really a history book -- written in a light and fun style -- that weaves topics, people, and events in the database together. (Idea comes from Carmen San Diego product -- disk comes with World Almanac.)
4. Criteria for voice being accepted on VS:
  - A. Amazingly interesting person.
  - B. Amazingly interesting event.
  - C. Amazingly interesting topic.
  - C. 100 Best Sound Bites from 20th Century.
  - D. 250+ Sound Effects.
5. Young fast-talking MC introduces voice studio and gets kids started using the product.
6. Pop-art, punk/rap/street/MTV type cover.
7. Content of material resembles:
  - Ripley's Believe It or Not!
  - Guinness Book of World Records
  - National Enquirer
  - Time-Life Series on Mysteries and Curiosities
8. Shows kids can produce resemble:
  - Oprah
  - Geraldo
  - Larry King Live!
9. Topics include:

disasters	death	disease	missing people	cults
AIDS	Al Capone	ghosts	sports figures	Etc.

MAZINGLY INTERESTING PEOPLE/TOPICS/EVENTS

process is like  
Archaeologist finding  
bone fragments - correlated  
partially by time & space in  
between & use

We want  
Kids to  
take  
ownership  
of this  
product.

Kids  
Underground  
Gangb  
FBI

to  
interesting  
information

Secret  
Nobody  
Knows

Voice  
Slants

due  
button due due

defective  
genius to  
imagination  
speculation  
& hypotheses

SERIAL KILLERS

GANGS

AIDS

ASSASSINATIONS

ELVIS PRESLEY

MARILYN MONROE

JFK

MARTIN LUTHER KING

JAMES DEAN

HIPPIES WOODSTOCK

KU KLUX KLAN

HITLER & NAZIS

DAVID DUKE

WATERGATE

NEO-NAZIS

CULTS & CULT LEADERS

RAP MUSIC

ROCK 'N' ROLL

MAFIA

GANGSTERS (AL CAPONE)

DISASTERS

SPORTS FIGURES - "Visuals  
Talking Baseball  
Cards"

GHOSTS

JOE MCCARTHY & RED SCARE

CHARLIE CHAPLIN

GRACE KELLY

AND (if possible)  
THEY WERE  
EYEWITNESSES  
OR  
PARTICIPANTS

and (if possible)  
THEY SAY  
SO WELL!  
(POWER-  
HYPNOTIC  
DRAMATIC)

MISSING PEOPLE

CHARLES LINDBERGH

MALCOLM X

BLACK PANTHERS

SPIES

HARRY Houdini

WITCHES

SADDAM HUSSEIN

SPLIT PERSONALITIES

ROLLING STONES

WOODSTOCK

JIM MORRISON & THE DOORS

GLORIA STEINEM

JACK KEROUAC / A. GINSBERG

LEE IACocca

GEORGE LUCAS

DONALD TRUMP

ANDREW LLOYD WEBBER

JOHN WAYNE K=MOVIE  
COWBOY AND  
S.G.M.D.

TERRORISTS

VIETNAM OPPOSITION

JANE FONDA

MIKHAIL BARYSHNIKOV

MARCUS GARVEY

NORMAN SCHWARTZKOFF

AMY FISHER

K=BASEBALL or  
K=SPORTS ILLUSTRATED AND S.G.M.D.

2 LIVE CREW

HIROSHIMA / ATOMIC BOMB

AXL ROSE

DEAD ROCK STARS

Jim MORRISON  
Jimi Hendrix  
Billy

SPIKE LEE

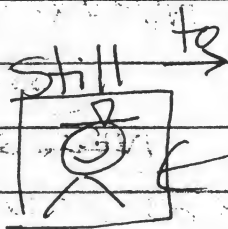
STEVEN SPIELBERG

SEX

DINOSAURS

PROHIBITION (put Capone's photo in)

DANNY DYKE



Motion

Hand  
comes in.

Hoover — NO (Shot) M394

Lindberg — NO (Speech) M4710

Speaking on Sadat M3913

Speaking about Nixon

Babe Ruth do almost anything when wound up  
run home → home run  
Parents baseball

M757

Edgar

Lady Bird Johnson speaking about the Fords

Denise Roosevelt / Florence Nitensple M3785

Words that impact you / Gap attention

C196 Franklin Roosevelt 1933 & Ronald Reagan

M1861 5

yes 1. Indian

? 2. hearing M1861 4

No 3. Sam McDowell M3870

maybe 4. Dewey Beaver M4785  
and medicine man

M1874

yes 1. Indian

Creation of the world turtle story

Starter Blocks to  
Propell them into  
Date of maybe wanting  
Birth/pe Key information  
# of president of an  
Key Quotes screen

Chief  
T.C.  
Adal

Post  
John Richard?  
Richard  
Wounded  
Knee



1890 max



# Multimedia Authoring Programs: Preparing Students for Publishing on the Internet

In the future, multimedia will be delivered over new information appliances that will combine today's computer, telephone, and TV. The way most people will access information will be via a miniature keyboard, or "zapper." Information will be delivered via composite documents consisting of text, sound, images, music, and video clips.

The World Wide Web (WWW) on the Internet offers a good preview of the type of documents we will interact with on the Information Superhighway of the future. Using Web browsers such as *Mosaic*, *NetScape*, and their successors, we will be able to search online libraries and access real-time information all around the globe.

How can today's students learn to be authors of these online documents and not just browsers and researchers?

Students could use HTML, the HyperText Markup Language associated with *Mosaic*. But classroom copies of this language are not commonly available, and there are few simple guides to this language available to the average student or teacher.

Students in our Multimedia Detectives project in Haslett and Okemos school districts are learning to author "composite" multimedia documents using inexpensive authoring programs now widely available for classroom use. Examples of these programs include: *Multimedia Scrapbook* (PC-Windows), *SuperLink* (PC-Windows), *HyperStudio* (Mac/Apple IIgs/PC-Windows), *Digital Chisel* (Mac), *Illuminatus* (PC-

*Windows*), *Multimedia Workshop* (Mac), and *Electronic Chalkboard* (Mac and PC).

All of these authoring programs let students practice authoring skills they will soon need to create complex multimedia documents online on worldwide publishing systems such as the WWW. At a minimum, these programs include a simple version of the following features:

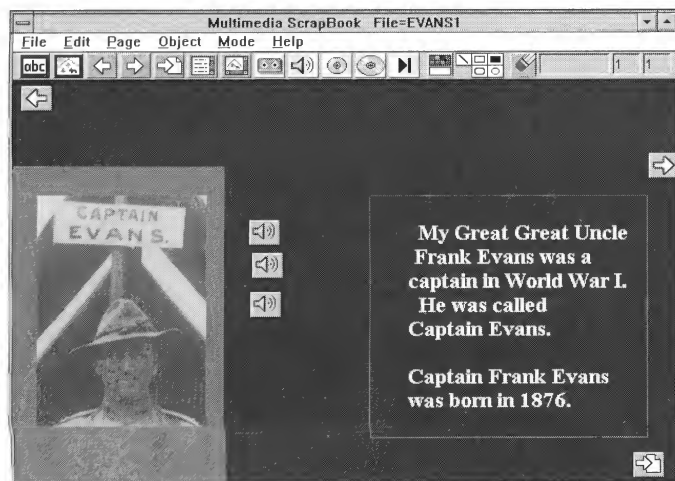
- Word processing program
- Paint program
- Sound editor
- Method for importing clip text, clip sounds, clip images, and clip movies
- Set of buttons that control other multimedia devices, including audio CDs and laserdiscs
- Set of hyperlink buttons that branch to other research sources and materials

Students can create rough drafts of their online reports, essays, and interactive databases in any of these authoring programs. These programs give students experience integrating many different multimedia data types into a single coherent document. Also, they teach students how to compose hypermedia documents that contain references to remote documents and media elements that can be retrieved in real time by a simple point-and-click.

Currently our student detectives give us multimedia documents authored in these classroom authoring programs. Then the online experts at our Web server host (MITN—the Michigan Information and Technology Network) translate the students' documents, via HTML, into WWW documents that can be accessed at our Multimedia Detectives Home Page found at:

<http://www.mitn.msu.edu/mmd/mmd.htm> (do not add an "l" at the end!).

In the near future we plan to teach students how to convert their own documents into web-ready documents for immediate transfer to *Mosaic* and *NetScape*, and for immediate publishing all around the world. Our preferred tool for this task is the translator program built into *ClarisWorks 4.0* (Mac or *Windows*). ■



Sixth-grader Becky Schuon used Multimedia Scrapbook to author an interactive report on her great uncle. Her report can easily be "republished" on the WWW.

[Fred D'Ignazio, *Multimedia Classrooms, Inc.*, 4121 Okemos Road, Suite 24, Okemos, MI 48864; [dignazio@msen.com](mailto:dignazio@msen.com).]

*Programs mentioned in this column have not been reviewed by ISTE; their appearance here does not constitute an endorsement by Learning and Leading With Technology or ISTE. SN = Product for learners with special needs.*

• SurfWatch Software's first product, called **SurfWatch**, is designed to help parents and educators reduce the risk of students accessing indecent material on the Internet. As the company points out, the free and open nature of the Internet contains a significant amount of content (both textual and visual) that depicts sexually explicit situations. *SurfWatch* screens Internet newsgroups, World Wide Web, FTP, Gopher, Chat, and other services. No material is actually removed from the Internet; it is simply blocked at each individual computer where *SurfWatch* is installed. *SurfWatch* retails for \$49.95 (specify Macintosh or Windows version), with a monthly subscription fee of \$5.95 for site updates. For more information, call 415/948-9500, or purchase the program via the Internet World Wide Web (<http://www.surfwatch.com>) or send requests to [info@surfwatch.com](mailto:info@surfwatch.com).

**SN** Students develop early vocabulary and the concept of opposites in ***Let's Go to the Circus: An Adventure in Opposites***. Within each of the six screens, there are four activity options: Discover Vocabulary, Discover Attributes and Actions, Discover Opposites, and Identify Opposites. The program interface options include keyboard, *TouchWindow*<sup>TM</sup>, single switch, and mouse. *Let's Go to the Circus: An Adventure in Opposites* costs \$115.00 for either the Apple IIGS or IBM version. Another way to purchase the program is in the *Special Circus Package* for Apple IIGS or IBM. The package contains *Let's Go to the Circus*, *My Paint*, and *Talking Circus Coloring Book* and costs \$150.00 from Laureate, 110 East Springs Street, Winooski, VT 05404; phone 800/562-6801.

• Still using Apple computers with children in grades K–2? Then read on. MECC has released five new Apple II programs. ***Woolly's Birthday***<sup>TM</sup> provides a discovery-learning simulation where children can develop an understanding of appropriate scientific processes as they investigate the physical properties of objects and explore how the senses can be used to distinguish physical properties of objects. In ***Get Well, Woolly!*** children study another area of science—health—as they learn about major internal parts of the body, explore what the internal organs do, and diagnose Woolly's illness by comparing his symptoms to the problems various “germs” are known to cause. On to language arts, where ***Move Over Mother Goose*** can help children learn how to use the elements of character (who), action (what), and setting (where) to create a Mother Goose rhyme, and more. ***Flip-Flop*** is the only product in this group not recommended for kindergarten. In *Flip-Flop*, a mathematics/geometry program, students practice developing basic visual skills, such as spatial perception, perceptual constancy, spatial relationships, and visual description, essential to many future areas of study. The last title, ***Quilting Bee***, is a personal favorite. In this program, students flip, turn, or slide their squares or rectangles to create a unit quilt square, extend the four-patch or nine-patch pattern, and complete a quilt on the screen. Students can learn transformational geometry as they create quilts using English or Spanish commands. The manual contains both English

and Spanish worksheets. Individual copies cost \$59.00 and are available from MECC at 6160 Summit Drive North, Minneapolis, MN 55430-4003; phone 800/685-6322, 800/663-7731 (Canada), or 612/569-1500.

• ***Math Workshop***<sup>®</sup> is a new elementary school math program from Brøderbund. Solving puzzles and interacting with the whimsical characters, students practice addition, subtraction, multiplication, division, equivalencies, estimation, fractions, logic, creative problem solving, geometry, and spatial relations. The “workshop” contained in the program is supervised by Polly Gonzalez, a young girl character who can be summoned with the help button, and offers seven activity areas: Bowling for Numbers, Rhythm Shop, Hidden Picture Puzzles, Puzzle Patterns, Drawing Board, Window Patterns, and Rockets. The exercises apply math concepts to other subject areas, such as art, language arts, music, and science. A single CD-ROM School Edition costs \$69.95; a Lab Pack with five CDs costs \$139.95 for either Macintosh or MPC (Windows) environment. *Math Workshop* is available directly from Brøderbund or through Brøderbund's Certified Partner in Education dealer network. Contact Brøderbund at 500 Redwood Boulevard (or PO Box 6121), Novato, CA 94948-6125; phone 800/521-6263 or 415/382-4400.

• ***Interactive Geography***, the newest release from Pierian Spring, is designed for students and teachers to create interactive multimedia instruction about geography. It is organized by five geography themes: location, place, people, movement, and regions. Student progress is automatically tracked and recorded as students use the lessons. The program automatically adjusts to each student's ability and performance. Content is presented at three levels: knowledge, understanding, and application. *Digital Chisel* projects can be attached to any *Interactive Geography* lesson. For more information on this \$99.95 Macintosh program, contact Pierian Spring Software at 5200 SW Macadam Avenue, Suite 250, Portland, OR 97201; phone 603/222-2044 or 800/472-8578.

• Interested in taking a “fly through” the human circulatory system? Try the ***How Your Body Works*** CD-ROM from Mindscape. Based on the Ziff-Davis Press book of the same name, *How Your Body Works* presents information about health and the human body from the perspective of the body's dynamic processes. The interactive and visually compelling 3D environment helps students see beyond individual organs to the amazing interactions that reveal how the body works. A 3D pathology laboratory is filled with interesting gadgets for exploring 11 modules. Students can also learn about prescription and over-the-counter drugs, be taught how to handle basic first-aid emergencies, and access a health directory. The CD-ROM is designed for ages 12 and up and is available for Macintosh and Windows at a cost of \$49.95. Mindscape is located at 60 Leveroni Court, Novato, CA 94949; phone 415/883-3000 or 800/234-3888.

# *The Technology Administrator's Field of Dreams*

## *Dream Number 2: Technology as a Solution*

In my last column I suggested that schools are slow to adopt new technologies in part because technology administrators may be building a "field of dreams" technology plan based on outdated myths about technology that are still common among most adults.

I'm 46 years old, and many technology administrators are approximately the same age (mid-30s to mid-50s). When we were growing up in the 1940s, 1950s, and 1960s, we watched the same sitcoms ("Father Knows Best," "Donna Reed," "Ozzie & Harriet") and the same TV commercials, and we learned that technology is our servant, our friend. We learned that technology means progress, convenience, and improvement in our quality of life. In short: "It brings good things to life."

As a result of our upbringing, members of my generation still see technology as:

- A vehicle, like a car from Detroit, that carries us someplace new and better.
- A simple, reliable, push-button appliance that provides immediate gratification.
- A Cuisinart food processor that takes raw input and converts it to useful output.
- A labor-saving tool, such as a lawn mower or dishwasher, that makes our lives easier.

All these notions of technology are accurate for certain kinds of machines (e.g., automobiles and toaster ovens) that automate physical labor. They are mature technologies. They are tame, stable, and not subject to random, unpredictable changes. Unfortunately, these notions are wrong when it comes to information and communications technology. We should all begin to question these notions of technology we picked up when technology was very different. Here are some questions we should ask.

*Is technology stable?* Information and communication technologies, such as

computers, fax machines, copiers, printers, TVs, and telephones, are anything but stable. In fact, they violently thrash about in abrupt, discontinuous, and startling mutations. And the period between these mutations keeps shrinking. State-of-the-art technology quickly becomes obsolete as it is surpassed by wave upon wave of even newer technologies.

*Does technology automate physical labor?* The new electronic technologies are not the mechanical oxen and donkeys of yesteryear that automated physical labor. Instead they automate mental processes. They are brain machines: communicators, thinkers, organizers, problem solvers, collectors, aggregators, and dispensers of languages, ideas, knowledge, and even thoughts. As Alan Turing aptly observed half a century ago, these machines are capable of simulating any other kind of machine, system, or organism existing in the real world... or beyond.

*What is technology's impact?* The new meta-machines are daily becoming more pervasive and intrusive. Sometimes invisibly, and sometimes rudely, they infiltrate our lives. They are becoming an intimate and necessary part of the way we work, the way we learn, and the way we play. The computer chip (semiconductor) industry is expanding explosively, as small microchips, like cupid's darts, are flung from factories and disappear inside our appliances, our homes, our clothing, our media, our toys, and even our bodies.

*Is technology merely a machine?* The newest technologies are primarily nonphysical objects embodied in the software that drives the microchips and, increasingly, all other machines. The most evolved form of technology, therefore, isn't physical at all. It's not a software disk, either—it's not even the bits stored on the disk. Instead, it's an information event,

a stream of bits in motion—commands, instructions, functions, and processes—when the software is actually running.

Technology only becomes real during runtime. It is a transient, constantly changing machine that is simulcast across the globe and deep under the seas at near the speed of light. It ricochets and caroms off TV stations, hospital operating rooms, bank ledgers, and robot probes blasting into interplanetary space.

### **Myth: Technology as an Appliance**

What differentiates information and communications machines from older technologies? Here are five characteristics of electronic technologies that make them different from older forms of technology:

- They are in constant mutation.
- They have instant obsolescence.
- They offer throwaway disposability.
- They are linked to every human endeavor.
- They are a medium for the mind, senses, and imagination.

The new technologies are transforming the world. They are radically altering all our activities and shaking up our notions of reality. But when we confront how computers are used in schools, we see that the old myths are still in charge. In schools we still see computers as:

- Instruction appliances
- Electronic typewriters, file cabinets, and adding machines
- Paper and book look-alikes
- Digital drillmasters, foremen, and bosses
- Pet rocks, white elephants, and high-tech doorstops

### **Computers: New Wine in Old Bottles?**

We insist on using computers in the same ways we used the older machines. But that hasn't kept us from catching a severe case of

technolust. As a bonanza of new boxes floods the market, our hunger for high tech grows and grows.

Locked inside an antiquated dream, we resemble joggers huffing and puffing on a George Jetson treadmill. As we chase after the flood of elusive new technologies, we frantically spend more money, buy more boxes, and run faster and faster just to stay on the cutting edge. But as many districts have already discovered, the cutting edge can become hazardous to the pocketbook. And districts often begin racing so fast that they can't stop spending.

Unfortunately, the cutting edge keeps receding over the horizon. Meanwhile, school districts' budgets are notoriously limited. This makes keeping on the cutting edge nearly impossible.

The outcome? There is a growing gap between what districts are spending on technology and what technology can deliver. Districts that relentlessly pursue the cutting edge face the danger of running short of funds and risk a backlash from disappointed school board members, teachers, and parents.

### Is Technology Really a Solution?

Computer salespeople race from school to school like fiery evangelical ministers. They preach the gospel that technology is a solution to all of a school's problems. According to technologists' scriptures, if we only have faith, not only will technology raise test scores but it will also get the district's kids into college and land them glamorous new jobs.

Technology has become the "S" word. With it a little boy or little girl might become Superman or Superwoman. Technology delivers Success because technology is the ultimate Solution. This type of thinking is so pervasive that we rarely stop to question it. But is technology really a solution?

I dramatize this question in my speeches around the U.S. by hooking up dozens of multimedia devices at my speaker's table and then yanking up the table skirts to reveal the spaghetti of cables lurking underneath. "Does this look like a solution?" I ask my audience. "Or does this look more like a problem?"

Maybe we should begin talking about technology as the "P" word (for Problem) instead of the "S" word (for Solution). Would you call

something a solution that costs more money every year, changes constantly, requires incessant training and retraining, breaks down constantly, and mutates unpredictably?

The new technology is hardly the tame little appliance that computer vendors picture it to be. Instead, it's more akin to a tempestuous sea or a wild, unruly habitat. Human beings have chosen this habitat, and we must now learn to develop coping skills in order to survive in it. It's our future. And even more importantly, it's our children's future.

We are like addicts suffering from an acute case of denial. In the 1940s and 1950s we dreamed of technologies that would make our lives simpler and easier. But our dreams didn't come true; the reality of the 1990s is very different from what we expected. Yet we are still locked inside these dreams of futures past. We still dream of a George Jetson future with a one-button classroom. Smiling teachers dressed in lab coats or hokey sci-fi movie costumes carry around a little miracle zapper that delivers instruction to chipper, perky little students with the click of a button. But is this the reality in your school? Would you even want this to be the reality in your school?

### Hordes of Cranky Teachers

If we don't want this reality, it's time to examine our notions about technology and search for realistic images of the way we actually use technology. If we accept the fact that technology creates at least as many problems as it solves, we can begin to rethink our image of the classroom of tomorrow.

As long as we look at technology as a solution, all we will ever be is cranky. We will be cranky when the printer breaks down, when students trash the files on our network server, and when the overhead projector bursts a bulb or blows a fuse. In every technology-using school, we are surrounded by cranky teachers. Why are these people whining, moaning, and complaining? Because teachers have been told over and over that technology is a solution. And, over and over, as a solution, technology fails to deliver. This makes teachers, like all normal people, a little testy.

But what if we confessed to the truth? What if we admitted that technology is really a gigantic problem? If we faced this truth head

on, we would be looking at an extraordinary opportunity for every school in the country, no matter what the state of their pocketbook, expertise, or experience with technology. Technology is the most wonderful environment for problem solving that's ever come down the pike. And isn't that what we are supposed to be teaching our students? We walk around mouthing educationese about "critical thinking" and "cooperative learning" and "team problem-solving." Yet we now have the most pressing reason to develop these skills, and no one even notices. But if we recognize technology as a problem, we have a perfect environment to put into use the new teaching practices being preached to our teachers.

### Are You a Victim or a Survivor?

Let's face it: With technology you are either a victim or a survivor. It's time to teach our kids and teachers the coping skills they need to survive in a high-tech environment. Moreover, these are the coping skills that today's students and teachers are going to need to get real use out of the equipment they've already got. These skills will become even more valuable in the future when still newer technologies emerge and these young people leave school and go searching for jobs.

I think it's time for true confessions. Confession Number 1: The emperor isn't wearing any clothes. Technology is the "emperor." And it's not a solution; it's a problem. Technology—as a problem—can come out of the closet and we can look at it as an opportunity to practice problem solving and teamwork and not whine about it when it doesn't work. It's also the perfect manipulative for young people to use to strengthen their thinking and communication skills for the future.

Next month we'll look at a strategy based on the idea of technology as a laboratory for problem solving and innovation. I have been working with teachers around the U.S. and Canada for the past year introducing this strategy in elementary, middle school, and high school classrooms. ■

*[Fred D'Ignazio, Multimedia Classrooms, Inc., 4121 Okemos Road, Suite 24, Okemos, MI 48864; dignazio@msen.com]*

# Multimedia Detectives: Exploring the World Wide Web at High Speed Using Cable TV

*Fourth- and fifth-grade students and teachers at Murphy Elementary in Haslett, Michigan, are not in the classroom today. They are wearing rubber boots and trying their best to tiptoe around in a bog near the school. Their aim: to investigate the fragile wetlands that abound in Meridian Township but that are increasingly at risk due to the rapid commercial and residential development in their area.*

Unlike most students who travel light when they explore, these students are laden with notebooks, pens, pencils, a tape recorder, a video recorder, and a pocket camera. They are "multimedia detectives," part of an ongoing program in Okemos, Haslett, and East Lansing schools. The program, now almost two years old, enables teachers in the three school districts to explore the ways that multimedia and telecommunications technology can help their students engage in "authentic" publishing.

For the last two years I have been working on the Multi-Media Detectives Project as a consultant, author, and instructor on behalf of my company, Multi-Media Classrooms, Inc. Among our project's many program sponsors is the Michigan Information Technology Network (MITN), and we use MITN's computer server to maintain our own web page on the World Wide Web on the Internet, which can be accessed at <http://www.mitn.msu.edu/mmd.htm>.

The teachers in our project and their fourth- and fifth-grade "detectives" plan to gradually develop the home

page into an online multimedia gallery featuring their science research on local wetlands in Meridian Township. Teachers would also like to see their students' web pages feature hypertext and media links to wetlands resources pulled from remote libraries, laboratories, and other research locations around the globe.

## Connecting the Web to Two-Way Cable

To help the students become more competent as web explorers we have begun using two-way cable TV as a control and viewing mechanism. The two-way cable connection is possible due to the sponsorship of TCI Cable of Mid-Michigan. TCI has set up two-way links in elementary school classrooms in each of the three participating school districts. A fourth two-way link has been set up in my Multi-Media Classrooms interactive-TV studio in Okemos.

TCI Cable and Michigan State University have installed a high-speed cable modem at the Multi-Media Classrooms site. This modem, made by Digital Equipment Corporation and known as "ChannelWorks," is the size of a small VCR. The ChannelWorks box is attached to an IBM PC via an internal LANtastic Ethernet card and a standard Ethernet cable. A second connection on the back of the box is then attached to normal coaxial cable just like the connection on the back of a TV or VCR. Thanks to an online gateway provided by MSU, our project's PC is now on a high-speed network that allows us to send and receive data over the Internet via a full TCP/IP connec-

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**Students can see the World Wide Web pages on their classroom TV via two-way cable link-up.**

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tion. The most remarkable benefit of this set-up is speed. We can transmit and receive data at the full Ethernet speed of 10 Mbits/second, i.e., at 1,000 times the speed of a normal dial-up phone line. This high-speed link makes it possible for our fourth- and fifth-grade detectives to be full-fledged multimedia web researchers using a web browser such as Mosaic.

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**The magic highway, which can take us around the globe or even into outer space, is, of course, the World Wide Web.**

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### **Watching the World Wide Web on TV**

How are students able to see the web screens on the computer? After all, the ChannelWorks box and its PC are tucked away in a back room at Multi-Media Classrooms, far away from the students' schools.

The key to it all is cable TV. Students are able to see the web research pages on their classroom TVs. This is accomplished via the two-way cable link-up, which beams the web screens appearing on the computer at Multi-Media Classrooms simultaneously into the classrooms in the three districts. The computer is able to "publish" these screens over television through the use of a MediaLogic box (the Mediator). The Mediator translates the computer's RGB video to normal TV (NTSC) video, which is then broadcast over the cable line.

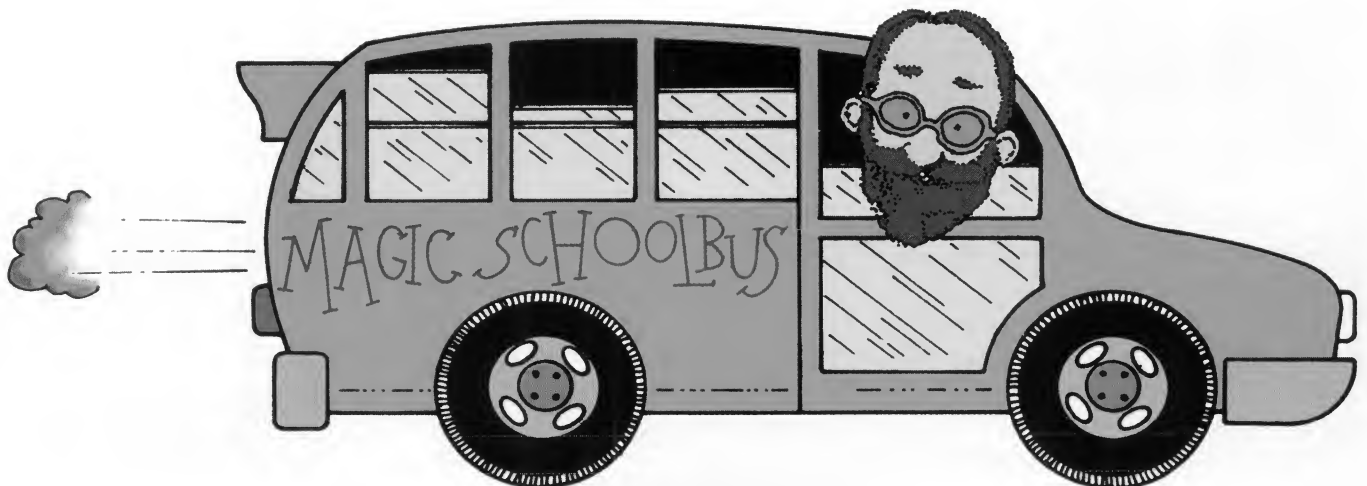
Students can see the World Wide Web pages on their classroom TV, but how can they control the remote computer located in the Multi-Media Classrooms studio? Because the cable line is two-way for audio as well as video, students are able to guide the computer operator at Multi-Media Classrooms just by talking! Each classroom has a standard video camera mounted on a tripod, with a small home-video microphone leading from the camera on an extension cord. To change the direction of exploration on the World Wide Web, students simply talk into their camera microphone and their voices come out loud and clear in the Multi-Media Classrooms studio.

### **Our Own Magic School Bus**

As a powerful metaphor to help students visualize this highly abstract process, we have been using the popular *Magic Schoolbus* books written by Joanna Cole and published in book form by Scholastic and as interactive CD-ROMs by Microsoft. We liken our cable/web connection to the Magic Schoolbus, which enables a classroom full of students to explore the world of science firsthand by traveling anywhere in space or time almost instantaneously. Our Magic Schoolbus is our PC, which has been souped up with the addition of the high-speed ChannelWorks box and the high-speed fiber optics connection provided by MSU and TCI. The magic highway, which can take us around the globe or even into outer space, is, of course, the World Wide Web. In the books, the Magic Schoolbus is driven by the students' teacher, the zany Ms. Frizzle. In our project I get to be the bus driver, and I drive our bus by clicking the mouse buttons on hypertext links that whisk us around the world on the web. And, like Ms. Frizzle in the books, I take requests from the students and drive the bus to research sites to help them find answers to their science questions.

We believe our Magic Schoolbus is something quite significant. It offers an affordable opportunity to explore the near future right now. We all hear about how we will someday have "video servers" that will be under the control of homes and institutions that are on the information superhighway. But thanks to the Multi-Media Detectives partners, fourth and fifth graders in our three districts are already controlling a shared, low-cost video server to do collaborative, real-time research at high speed on the Internet. ■

[Fred D'Ignazio, *Multi-Media Classrooms, Inc.*,  
4121 Okemos Road, Suite 24, Okemos, MI 48864;  
dignazio@msen.com.]



# Minimalist Multimedia: Authoring on the World Wide Web

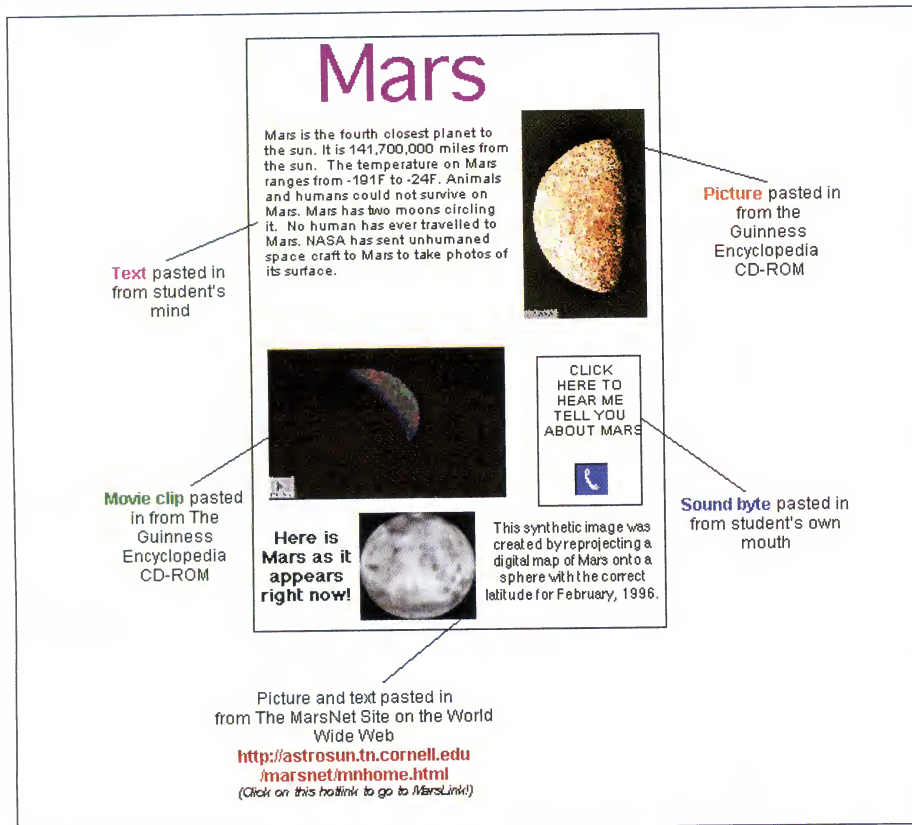


Figure 1. Eric's Mars Report.

For the last year I have been speaking around the country at conferences and doing TV shows on my concept of "Minimalist Multimedia." My own kids even use it (see Figures 1 and 2). Minimalist Multimedia is KISS multimedia—Keep It Simple to Survive! This concept involves using older programs, such as paint, drawing, and word processing programs that you already have on hand, to create multimedia and do authoring on the Internet.

The recipes on page 51 provide instructions for a minimalist multimedia project using ClarisWorks 4.0, which is a popular productivity package used in thousands of schools around the country. There are versions of ClarisWorks both for Macintoshes and Windows, and ClarisWorks includes a database, a paint program, and, of course, a word processor—all the types of programs that most people are comfortable using. But if you don't have ClarisWorks, don't despair. Minimalist multimedia works on most word processors, drawing programs, and other applications. To find out if it works on a program you use and love, just try it!

Continued on page 50

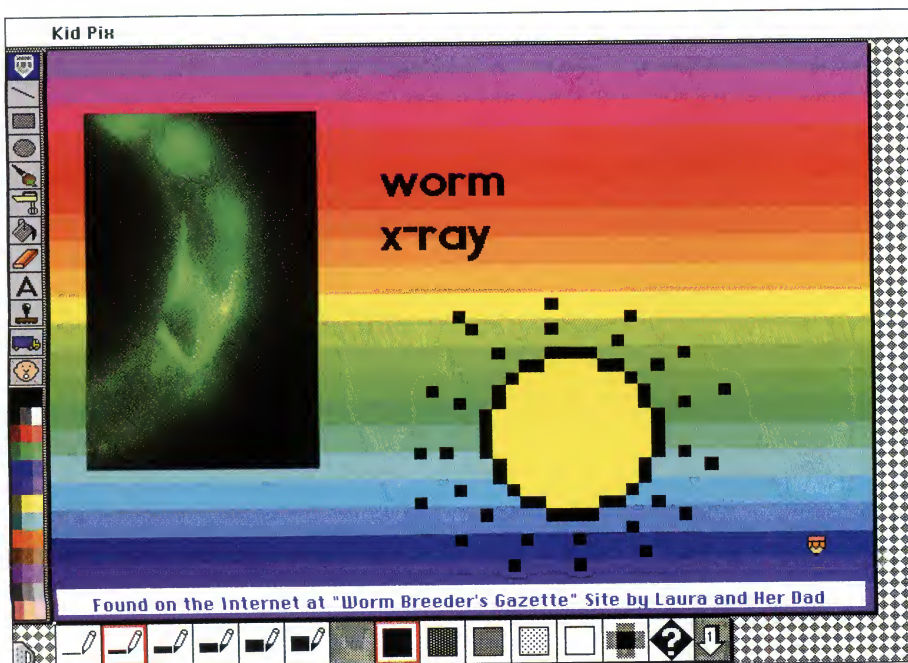


Figure 2. Laura's Worm Report.

## The Mars Report

The three key guidelines for minimalist multimedia are:

1. Find a program you already know how to use.
2. Keep the costs low—or zero!
3. Make something quick!

In line with these guidelines I approached my 16-year-old son Eric one night and asked him to create a multimedia report in *ClarisWorks* 4.0. Eric had used the *ClarisWorks* word processor for his school homework, but he had never added multimedia. Nor had he used the program to author on the Internet. In fact, we didn't even have the IBM version of *ClarisWorks* installed on our home computer. Because of this, I assigned the task to Eric and figured I wouldn't see any products for a day or two. My wife and I wished Eric good night, and went right to bed.

An hour later a knock on our bedroom door awakened us. Eric stuck his head through the door. "Dad," he whispered, "I'm done. Come and look."

"Can't this wait until tomorrow?" I groaned, my face buried in my pillow.

"Daaaaad," Eric pleaded.

I got up and trooped barefoot into the family study. Eric had created his Mars Report on the word processor and transferred it to the *ClarisWorks* Draw program to illustrate it, all in under an hour! Figure 1 (page 49) shows what I saw.

Eric's Mars Report was definitely an example of minimalist multimedia. And I was tickled pink the next morning when I successfully copied the Mars Report file on an IBM disk, transferred it onto my Mac, and popped it up on my Mac screen. It looked the same as on the PC. "Minimalist multimedia," I sighed happily. "No hassle, no muss, no fuss. It just works. Yes!"

Later that day when Eric came home from school, we used the new Internet-friendly HTML tools built right into *ClarisWorks* 4.0 (see Figure 3) and created Internet (HTML) documents that could be read by the popular *Netscape* browser. We didn't have to author our own HTML files or learn the HTML language. We stayed inside the *ClarisWorks* word processor the whole time. When we saved our file, it automatically created an HTML file and a *ClarisWorks* word processing file. We pointed the *Netscape* browser at the HTML file, and it read it right away!

## Dance to Your Word Processor!

On page 51 I have included a whole cookbook of recipes for all you minimalist authors out there who are suffering from multimedia "OD." These recipes were designed for *ClarisWorks*, so if you have access to that program you can start immediately creating word processing files that show movies, play Beethoven, and show pictures and animations. When your word processor starts playing Songo music from Cuba or World Beat music from Africa, you may even kick up your heels and begin to dance. Think of it: dancing to your word processor! Who says word processors are "state of the past"? Not my word processor, and I'll bet your word processor is multimedia-ready too. You just have to try it!

## KidPix on the Internet

Now that you know about minimalist multimedia, go back to your computer, pick a program, and do something special with it. It is surprising what you will come up with. Even the simplest programs may be multimedia-ready, so you can do neat things off and on the Internet.

Take *KidPix*, the popular paint program from Brøderbund Software. My seven-year-old daughter Laura and I were doing a Worm Report one night as homework for her first-grade class. We were about to draw a picture of a worm in *KidPix*, when Laura suggested we try looking up "worms" on the Internet. I launched *Netscape*, entered "W-O-R-M" into the search box for Digital Equipment's popular "Alta vista" search engine (<http://www.altavista.digital.com/>), and pretty soon Laura and I were learning more about worms than we ever wanted to know. At The Worm Breeder's Gazette site, Laura discovered a picture of a worm X ray that fascinated her. On a whim, I held down the *Netscape* mouse button, chose Copy Image to Clipboard from the pop-up dialog window, and switched back to the *KidPix* program.

I went to the Edit menu in *KidPix*, chose Paste, and, voila!, Laura had a genuine worm X ray from the Internet for her Worm Report in *KidPix*. The whole process took about 15 seconds! Figure 2 (page 49) shows her report. It is a perfect example of minimalist multimedia since it was quick, it was done in a program our family already had (*KidPix*), and it is only one page long.

## Conclusion

The two reports Eric and Laura created are good examples of the kind of work students of all ages can do with minimal multimedia resources. Flexibility and creativity is all it takes for you to add this new dimension to your students' work. ■

[Fred D'Ignazio, *Multimedia Classrooms, Inc.*, 4121 Okemos Road, Suite 24, Okemos, MI 48864; [dignazio@msen.com](mailto:dignazio@msen.com)]

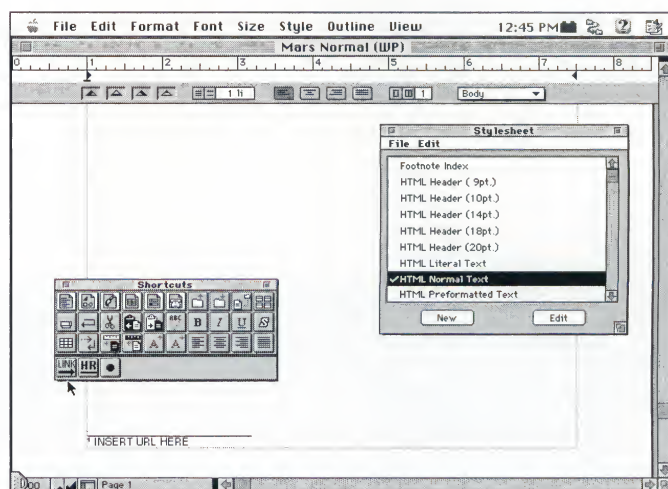


Figure 3. Shortcuts tool palette and Stylesheet palette.

# ClarisWorks 4.0 Minimalist Multimedia Recipes

All recipes in this section are written for *ClarisWorks 4.0* for the Macintosh. However, you should be able to easily adapt them to other software programs with multimedia capabilities.

## Adding Multimedia to a Word Processor Document

To add a picture file, voice file, movie file, or MIDI music file from your hard drive or CD-ROM:

1. Open an existing document or create a New document.
2. Select Insert from the File menu.
3. Find the file name for the picture, voice, movie, or MIDI file you want to insert. Double-click on it to insert it into your document.

## Creating an Internet Document

1. Launch *ClarisWorks*.
2. In the New Document window, click the Use Assistant or Stationery box.
3. Choose All Stationery in the Category menu.
4. Scroll through the All Stationery window and double-click on WWW (HTML) Document.

## Using Internet Shortcuts

1. After creating the Internet document in the previous section, choose Shortcuts and then choose Show Shortcuts in the File menu.
2. The Shortcuts tool palette appears with three Internet shortcuts as the last three tools: Hotlinks, Horizontal Rules, and Bullets. Figure 3 (page 50) shows the palette.

## Using the Internet Style Sheet

1. Choose Show Styles from the View menu.
2. The Stylesheet palette appears (see Figure 3) with the several choices, including HTML Header(s), HTML Normal Text, and HTML Preformatted Text.

## Creating New Internet Text

1. Select an HTML style from the stylesheet.
2. Type in the text.

## Converting Existing Text to Internet Style

1. Highlight the existing text.
2. Select an HTML style from the stylesheet.

## Creating Internet Hot Links (Part 1)

1. Highlight the text you want to hot link.
2. Click the Link button in the Shortcuts palette.

## Creating Internet Hot Links (Part 2)

1. Launch *Netscape*, the Internet browser.
2. Go to a Web site with hot links (colored, underlined text).
3. Point to the hot link you want to capture and hold down the mouse button.
4. When the menu appears, select Copy This Link Location.

## Creating Internet Hot Links (Part 3)

1. Switch back to *ClarisWorks*.
2. Highlight the Insert URL Here footnote at the bottom of the page.
3. Paste the hot link over it.

## Coordinating ClarisWorks With Netscape

1. Run *Netscape* and *ClarisWorks* at the same time.
2. Save the file in *ClarisWorks* and check it in *Netscape* by selecting Open File from the *Netscape* File menu. Open your HTML file.
3. The second time you return to *Netscape*, click Reload to open the file. (Do this each time you change your HTML file in *ClarisWorks*.)

## Saving Files as HTML (Internet) Files

1. Don't select Save in the *ClarisWorks* File menu or you will save the file as a regular word processor file. Instead, choose Save As in the File menu.
2. Scroll through the Save As drop-down menu and select WWW [HTML]. Give the file a distinctive name and click Save.
3. This is the file you should open in *Netscape* by choosing Open File from the File menu.
4. If you open the HTML file in *ClarisWorks*, it will appear as coded text, as shown in the following example, which is a brief excerpt from Eric's completed Mars Report document.

```
<HTML>
<HEAD>
<TITLE>mars4.html</TITLE>
</HEAD>
<BODY>
&lt;HTML&gt;<BR>
&lt;HEAD&gt;<BR>
&lt;TITLE&gt;mars1.html&lt;/TITLE&gt;<BR>
&lt;/HEAD&gt;<BR>
&lt;BODY&gt;<BR>
<BR>
...
```

## Updating Internet Files

1. You still need to save your special *ClarisWorks* word processing file for further editing.
2. In *ClarisWorks*, click on Save in the File menu to save the file. Use a different name than you used for the HTML file.
3. After saving it as a *ClarisWorks* file, you can open it later and edit it.

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Dick Ricketts, & Siobhan Underwood  
216 pages

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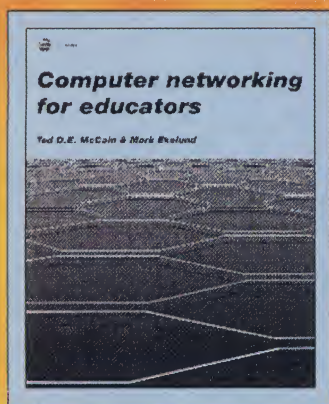
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**Fred D'Ignazio**, President of Multi-Media Classrooms, Inc., is an internationally renowned author, educator and television commentator. Fred is currently working with the Florida Department of Education to set up a model multimedia training center at the University of Central Florida in Orlando.

**Multimedia is more than a "branch" of computer applications.** Rather it is the future of all applications. All information and knowledge in our society will be transformed as it is translated into the new digital format. Computers themselves will become something new. It will be less appropriate to think of computers as "technical" or as "data processing devices" and more appropriate to think of them as **media** players, **multimedia** recorders, hyper-books and **multimedia** telephones and TV's.

**Are you getting nervous? Does all this multimedia sound complicated?** Not to your students! Remember, your students are "MTV babies." They are graduates of Nintendo Boot Camp, in which they have learned how to do audio, video and power cabling. They have mastered complex game controls and they have survived fast-paced video games with

complicated 3-dimensional displays. (Meanwhile, we adults are still trying to learn how to use a computer "mouse.")

By using multimedia in the classroom, the results in student performance will be stunning. Kids who used to be troublemakers, poor performers, or merely uninvolved are now passionately engaged in the learning process. And, as a whole, your students are taking more responsibility for their learning, they participate more in the learning process and they are committed to working together harmoniously and cooperatively.

For further details on how to get your students involved in the learning process, **please turn to page 39.** Outlined on this page are ten steps that will help bring your teaching to life through the use of multimedia.

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# Teaching With Multimedia

By Fred D'Ignazio

Everyone has heard about "multimedia," but to many teachers the term sounds a little bit frightening and technical. How can a teacher who isn't a computer whiz take his/her first steps into this fascinating new environment?

The trick is to **keep things simple**. After working with thousands of teachers over the last ten years I have adopted the motto: "K-I-S-S"... Keep It Simple to get Started — Keep It Simple to Survive. You don't have to take a giant leap into multimedia. Instead, it's smarter to start with *baby steps*. Here are ten baby steps to help you and your students make a sound beginning in this exciting new area:

**1** Group your students into multimedia authoring teams. As the students learn how to create multimedia "documents" they also learn how to operate multimedia equipment. As a result they become an excellent crew of **technology aides** to you and **peer coaches** to their fellow students. This places the "technical" side of multimedia onto the students' shoulders, and leaves you free to concentrate on *instruction*.

**2** Your library media specialist can help you obtain a LaserDisc player for your classroom (see page 20). The LaserDisc player will probably come into your room on a cart already cabled to a TV (see page 33). Your "technology aides" can then help you operate the player.

It's unbelievable. Within a single class period you'll be hooked. A single LaserDisc can contain an hour-long movie or up to 54,000 video "slides." The degree of control you and your students have is amazing. Slowing down historic events, freezing scientific experiments, and replaying key moments in plays with a single button will help you realize that video can become a tool for thinking, reflection and analysis.

**3** Your students can create multimedia slide shows and movies on the LaserDisc player by writing down LaserDisc frame numbers and keying them in on the front panel of the player or into the barcode reader. They can do library research and write scripts which they can deliver orally in front of the class as fellow team members operate the LaserDisc player.

You can also enlist your students as audiovisual aides. You can plan out future lesson plans and tell the students to research available LaserDiscs for images, movies and sounds that fit into the subject area and the amount of time that you have for a given lesson. When it comes time for you to cover the subject in front of the class, your student team is ready to accompany your presentation with rich audiovisual material.

**4** There are several new, easy-to-use LaserDiscs that add power and interest to the



stale old classroom textbook and worksheet. These new "electronic textbooks" are available for all subject areas and can be used creatively in a most grades, K-12. (See pages 14-19)

**5** By acquiring inexpensive software programs that print out LaserDisc bar codes on a computer printer, students can cut and paste these codes in the margins of their written or typed reports. When presenting to the class, they can scan the codes and call up maps, graphs, video slides and movies stored on the LaserDisc. (See page 20)

**6** Your students can add to their classroom publishing projects by going to the library media center and learning how to use the new CD-ROM electronic encyclopedias (see page 5). These encyclopedias are remarkably easy to use and make research interesting and quick.

You might also arrange for the CD-ROM encyclopedias to visit your classroom on a loan or semi-permanent basis. You will be fascinated with the way you can look up cross-references to topics in mere seconds, and are sure to think up additional projects for your students.

## Use multimedia in the classroom to involve your students in the learning process.

**7** There are simple graphics programs your students can use to create an electronic slide show. Authoring programs like HyperStudio, Linkway Live, HyperCard and others (see page 23) allow students to sequence their individual "slides" and create special-effect transitions between slides such as wipes, dissolves, and fades. The students can turn in the slide show on a diskette, print out the individual slide on paper, or present the slides to the class directly off the computer monitor.

**8** You can also borrow an LCD panel for your classroom (see page 30). After letting your "technology aides" figure out how to set it up, you are ready to display your students' computer slide shows on a large classroom pull-down screen.

**9** Set up your own classroom workstation. Your school can purchase an entire multimedia workstation through the Educational Resources catalog.

**10** Expand your students' use of different media to enliven and enrich their multimedia authoring. Students can add still images to their computer documents by using a Canon XAPSHOT camera, ComputerEyes digitizing board, hand scanners or a FotoMan image-capture device (see page 26). They can also add motion images with a school video camera, video-capture cards and "movie maker" software (see pages 21-23). Sound, music and spoken narration can enliven their projects through use of musical keyboards, sound-recording devices, and sound and music software (see pages 28-29).

So turn your students loose by introducing multimedia into the classroom! Tell them that you expect them to operate like a "swat team," getting equipment set up, checked out and operational within the first five minutes after class begins. They also need to operate it, troubleshoot it, and get it back to its storage location the minute you're finished. ●

For more detailed information on how to use multimedia in the classroom, check out the following teaching materials by Fred D'Ignazio:

- Teaching with Multimedia**  
30 minute video tape  
(Retail \$49.95) . . . . . \$39.95
- Multimedia Cookbook: How to Use the School Media Center as a Launch Pad for Student Authors and Teacher Explorers**  
20-page booklet  
(Retail \$24.95) . . . . . \$19.95



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# DISCOVERY: THE STARSHIP ENTERPRISE: NEW OPPORTUNITIES FOR LEARNING IN THE 1990s

FRED D'IGNAZIO

*Department editor's note:* Saturday morning. Thirteen-year-old Kip's radio alarm goes off. He punches the snooze alarm and switches to CD. Later on, he and Ryan will walk to the video store and rent a video to watch tonight while they pig out on microwaved pizza and popcorn. This morning, though, Kip will be content to stagger down to the family room and get first dibs on the Nintendo before little sister wakes up. Kip has been loading programs into the family Mac and Apple since he was five and using the word processor for his school reports since fourth grade. He has his own CD, audio- and video-cassette collections, his own 35mm camera, and is fairly steady and creative with the family videocam.

Monday morning. First hour. Kip slips into his seat just as the tardy bell rings. A quick look around the room to nod to friends. Attendance is taken and the lecture begins. Second hour, third hour, fourth hour, then lunch—hurray! In fifth hour the teacher tells them to have a draft ready tomorrow so that they can have a turn in the word-processing lab. There'll be a film during the sixth hour on Friday. Kip has gone from a technology-rich home to classrooms dominated by textbooks and lectures, classrooms that treat him to an occasional film or trip to the computer lab.

Little sister Libby has hundreds of books that are her own, categorized in shelves according to fiction, nonfiction, author, and theme. When Libby's monthly magazines come in, they're usually crammed in the mailbox with Mom's and Dad's. Libby leafs through the daily newspaper for interesting news pictures and for her favorite cartoons. She's an indispensable helper in the store, matching coupons and sale items and pointing out savings, big savings, and new improved savings.

Monday morning. An eager first grader, Libby skips into a classroom that has brightly colored bulletin boards and a smiling teacher but no classroom library, no magazines, and very little environmental print—a classroom dominated by basal readers and controlled vocabulary.

Two atypical scenarios? I don't think so. Kip and Libby come from a typical middle-class home that abounds in discount-store electronics and garage-sale

paperbacks. Kip's classrooms, I fear, are fairly typical in a one-overhead-per-classroom, one-movie-projector-per-department junior high. Luckily, Libby's lot is very different from the scenario I painted. Libby attends a whole language school, Awakening Seed. Her classroom is dominated by language, including a class mail center, posters, directions, message boards, and an extensive classroom library featuring many books authored by the children.

In a world where calculators, computers, and word processors are helping families and businesses not only to cope with, but also to take advantage of, the quickly proliferating body of knowledge and skills that humans are amassing, many classrooms still demand that children drill to build speed in calculation. Classrooms in which children are accessing great sources such as university and national libraries and sharing their new-found knowledge with children in other places are increasing in number, but not nearly fast enough to prepare the students of today for the information explosion that will blast them, ready or not, into the twenty-first century.

Kids today are learning from and controlling technology at home that many of us were only dreaming of years—maybe months—ago. If the technology in the classroom cannot keep up with what the kids already know, are we setting ourselves up for a generation of dropouts who leave because we cannot offer them enough of an educational challenge? In this age of empowerment and restructuring, we may need to look at some very radical changes in the way we deliver instruction. First, however, we'll need to convince the purse-string holders that real, effective change will not come cheaply but that dollars spent in technological education are an investment in the economic future of our country.

I remember reactions ranging from delight and amusement to resentment and hostility when programs such as "Sesame Street" began to "jade" students to the drones of lectures. Yet, teacher training programs have not changed dramatically in the last 25 years to accommodate students coming to us a lot more sophisticated than they ever did before. The recently released Metropolitan Life/Harris Survey of the American

Teacher 1990 showed that by a margin of 58% to 42%, new teachers felt doubts about being adequately prepared to enter the classroom, feeling that they lacked practical training. In the future, teachers will need a grasp of technology before they take over a classroom if they hope to keep up with their students, even in first grade!

Back to Kip and Libby. Regardless of what their classroom environment may or may not provide them in the way of technological and literary competence, their home environment keeps them abreast, at least, of mainstream competence. There are other children, however, for whom the classroom fails to introduce the empowerment and thrills of technology and language. There are other children, too, for whom the classroom represents an inferior, lackluster, irrelevant substitute for a world they already know and are part of. For all these children's sakes, we need to look at what is, what could be, and, to use the image that Fred D'Ignazio does in what follows, to dream of going "where no one has gone before." (JH)

### A Powerful Metaphor

In the popular TV series "Star Trek," Captain James Kirk led his courageous crew across the galaxy, exploring new worlds and new civilizations. The show was a popular "space opera" (as

*Multimedia software is geared to train a new generation of multimedia authors to write the "literature" of the future. . . . The software is exciting, accessible, and hard to describe.*

*Time* called it), but it can also be a powerful metaphor for classroom learning. Three major strategies for teaching and learning in the 1990s are cooperative learning, thematic learning, and multimedia learning. All three of these strategies can be implemented in the classroom by adopting "Star Trek" as a metaphor for students' learning.

### A Common Enterprise

Recall that many of the "Star Trek" episodes took place on the bridge of the starship Enterprise. Captain Kirk was the central figure on the bridge, but he was surrounded by teams of experts who were specialists in different areas, including navigation, propulsion, engineering,

science, computers, medicine, and planetology. All these experts were united behind Captain Kirk in their common enterprise: to boldly go where no one had gone before. Each week, in each episode, it took Kirk and his specialist teams' combined efforts to pilot the Enterprise starship to its destination and to cope with the dramatic crises that befell the Enterprise and threatened its crew. Today's teachers are facing the challenge to make their lessons more socially interactive, interdisciplinary, and embedded in real-world knowledge, topics, and themes. The bridge of the Enterprise, with its visionary and forceful leader and its teams of specialists working on complementary parts of a common endeavor, can be a model that teachers use to meet this challenge and to engage their students in the learning process more profoundly and enthusiastically than ever before.

### Where No Learner Has Gone Before

Imagine leading a classroom in which the teacher played the role of Captain Kirk and the students were organized into specialty teams, all working together to explore a new world of knowledge such as whales, the American Revolution, Impressionist painters, China, gravity, or Mark Twain. Students could be organized into cooperative-learning groups, each of which had responsibility for an interdisciplinary subtopic under the larger topic. For example, with the "Mark Twain" topic, the teams could be organized around the following:

Biography	Twain's life.
Geography	The Holy Land, Hawaii, the Mississippi, Nevada, San Francisco, and other locations important to Twain's thinking and writing.
Humor	What makes Twain's work so enduringly humorous?
American History	What were the important issues in our country while Twain was alive? Which of those issues are still current today?
Racism	How do Twain's works treat racism, slavery, and prejudice? Why is Twain's <i>Huckleberry Finn</i> so controversial today?

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### Multimedia Inquiry

The student inquiry teams could perform their investigations using standard classroom tools, including paper, pencils, and library books. But they could also mimic the starship's crew and use electronic research tools—so fresh and exciting that they transform the subjects the students are studying.

Classroom teachers can assemble *multimedia inquiry centers* using equipment that is common in most schools. Working together as an “acquisitions” team, two or three teachers can find a wheeled media cart and equip it with the following components:

Computer	Apple, IBM, Commodore, Tandy, etc.
VCR	Standard school or home VHS model
TV	Large-screen for classroom presentations and discussion
Tape Recorder	Standard classroom model—or boom box, Walkman, etc.
Camera	Any video camera. Small camcorders are easier to use, and they combine a camera and VCR in a lightweight case.
Cables	Standard video and audio “dub” cables
Adapters	Headphone adapters (1/4” and 1/8”)
Software	“Multimedia Software” such as HyperCard on Macintosh computers, HyperScreen on Apple II computers, Linkway on IBM/MS-DOS computers, AmigaVision on Commodore Amigas (These are generally under \$100 per program, include a graphics program and word processor, and are available for almost all types of computers.)

This is a powerful multimedia inquiry station. Later on, however, when the budget permits, teachers can increase the station's learning power by acquiring a laserdisc player (they start at around \$800 for computer-controllable models), a CD-ROM player (some new computers have a CD-ROM player—and an accompanying elec-

tronic encyclopedia[!])—as a built-in disk drive), and “multimedia” computer boards, such as a video digitizer (to capture images off the video camera or laser player) or an audio digitizer (to capture sounds from the tape recorder, camera microphone, TV, or laserdisc).

### Multimedia Authors

Multimedia software is geared to train a new generation of multimedia authors to write the “literature” of the future. It enables students to expand classroom publishing to include colorful graphics, moving images, sound effects (like crashing waves and paddlewheel foghorns), music, and written and spoken words. The software is exciting, accessible, and hard to describe. The best way to learn to compose a multimedia publication is to sit down and try it yourself.

In some ways the software resembles a word processor. However, the words that you compose are now active objects—doorways that lead you to related topics and triggers that launch an electronic slide show, a laserdisc segment, or recall important information that you've gathered in your research. Pictures, too, are different. They are no longer meant to be looked at and admired. Overlaid atop the pictures are invisible “buttons” and “hot spots” that turn the pictures into visual menu topics you can choose to learn more information. Point a little on-screen arrow at a picture of a frog, for example, and the publication may take you to a computer screen with excerpts from Mark Twain's famous short story, “The Celebrated Jumping Frog of Calaveras County.” Or a scanned image of a 19th-century print of Tom Sawyer at an unpainted picket fence might cause the computer to replay the voices of students reading the scene aloud from the original *Tom Sawyer* novel.

### Research and Publishing Teams

Students can work together collaboratively and cooperatively to research complementary areas of a powerful “umbrella” topic. Then, at the end, they can transform their research into multimedia sounds, images, and text. This strategy works in a classroom that is sharing a single multimedia center with up to 25 students, or even with one or more other classrooms. The only time the equipment is used is at the end of the activity—after the students have gone to the library, done their research, organized their materials, and held dis-

cussions. Multimedia becomes a powerful add-on to standard student research projects. However, by adding multimedia to these projects, teachers can transform the materials into new multi-sensory dimensions. Such multimedia activities can spark the students' interest in literature and make words and language come to life in an electronic environment that is attractive to today's "TV babies."

### Eyes, Musicians, and Imagineers

How does a teacher take a single learning center and make it accessible to 20 to 30 students? First, encourage students to use the center once or twice at school and then try to replicate the center at home (with a camcorder, VCR, TV, a musical keyboard, boom box, CD player, home computer, or other multimedia piece) to do much of their "production" work outside class.

Second, once students and teacher have created two or three multimedia publications and shared them with faculty and parents, it is possible that equipment will suddenly find its way to the classroom. If parents have old computers, stereo equipment, VCRs, or even cameras around the house, they may donate them to the class in order to get the equipment out of the house and with the hope of turning it into an educational tool.

Third, try dividing the center into modular units reflecting parts of the production process. After the students have all done their research prewriting, writing, and publication (in print), divide them into the following teams to turn their print publications into multimedia publications: *Eyes* (capture camera images and still-image computerized images), *Musicians* (collect sound effects, choose music soundtrack), *Artists* (create non-computer and computer graphic images, animations), *Writers* (work with the printed "scripts" and publications), *Editors* (edit all the diverse pieces into a final product on videotape or audiotape), *Reporters* (conduct interviews, write narration, read script), and *Imagineers* (act as "directors" to create a single look and feel to the final publication).

Much of the teams' final work can be done without any equipment at all. Even more can be done by dividing scarce pieces of equipment among student teams (e.g., *Eyes* get the camera; *Musicians* get the tape recorder; *Artists* do much of their work on paper and later shoot it, up

close, with the video camera; *Writers* work from paper; and *Reporters* practice their scripts orally). The process is a masterful way to teach students cooperative learning, task-oriented communication skills, critical and creative thinking, organization skills, and how to take diverse pieces and choreograph or synchronize them into a final product where split-second timing can be important. In addition, the process is accessible to students with all sorts of learning preferences.

### The Teacher as Captain, Scout, Explorer

The teacher's role as "captain" of the classroom starship Enterprise includes being a scout, explorer, leader, arbiter, "gopher," and catalyst. The teacher does not have to be a technician or multimedia specialist. Kids are aces in this department. They will take the responsibility for acquiring the multimedia equipment, hooking it together, maintaining it, and preventing it from being broken or stolen. The teacher is the starship's knowledge specialist and learning specialist—she knows where the starship needs to go and how it's going to get there. The teacher's job is to tap the complex cluster of visual, auditory, and three-dimensional literacies that students have developed as a result of hundreds of hours

*A multimedia center, improvised from equipment found in the school building, can be the starship that carries students on breathtaking voyages of discovery.*

of exposure to electronic media. Her challenge is to turn student multimedia consumers and readers into writers, authors, and composers.

In the past, powerful electronic media have been used to sell kids things like chewing gum, cars, pop music, and video games. Now the teacher can enlist the kids' powerfully honed multimedia literacy in a quest to learn language. Teachers love language, and language is the "conceptual sea" in which these kids swim—even in a multimedia world. Language is still their primary tool for thought, communication, entertainment, and employment. A multimedia center, improvised from equipment found in the

## LANGUAGE ARTS

school building, can be the starship that carries students on breathtaking voyages of discovery. It will be propelled by students' endless fascination with all things electronic. The ship is waiting to be launched. The crew stands poised for the first adventure. All the ship needs is a captain and a flight plan into new worlds of knowledge that only you can imagine.

*Fred D'Ignazio is presently director of the Teacher Explorer Center, Michigan's first model classroom of the future, funded by Michigan's State Board of Education. He can be reached at Teacher Explorer Center, East Lansing Public Schools, 509 Burcham Drive, East Lansing, MI 48823 (517/337-1781) and welcomes inquiries about the center.*

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A one-week institute in children's literature, called ROGUES AND REBELS: SYMBOLS OF RESISTANCE, will be held at Williams College, Williamstown, Massachusetts, on August 4-10, 1991. Sponsored by Children's Literature New England, the institute will feature seminars, discussions, and lectures by such noted children's writers as Lois Lowry, Barry Moser, Katherine Paterson, Robert Cormier, Patricia MacLachlan, and many others. For information and applications write to Martha Walke, Registrar, 2111 North Brandywine Street, Arlington, VA 22207, or call 703-243-5135.

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# *Surviving* *a Multimedia Workshop* *Without a Single Computer*



*Hands-On Activities  
That Can Save the Day!*

*By Fred D'Ignazio and Ca*

## Activity No. 1 Take a Fresh Look at Your Relationship with Technology



Participants use various high-, medium-, and low-technology materials to create some object—say, a pizza. Bring a hodgepodge of objects, such as SCSI cables, construction or butcher paper, portable CD players, CD-ROMs, flashlights, batteries, PCMCIA cards, markers, Ethernet cables, scissors, tape, and floppy disks. You can also use objects you find around the room. After participants finish their projects, ask them to analyze their attitudes toward technology and then reevaluate their relationships with it.

Have you ever conducted a multimedia workshop in a classroom full of teachers (or students) without a computer? It's the perfect time to panic, right? But wait. If you dive beneath the computer activities to spotlight the key processes you really wanted to demonstrate and practice, then you can still get out of the workshop alive.

My daughter Catie and I recently conducted a hands-on workshop in Denver titled "The Multimedia Classroom: Effective Classroom Applications." This two-day, 10-hour workshop for teachers who flew in from all over the United States was conducted entirely without computers.

We divided the workshop into five modules. I conducted a lecture on each topic, then Catie followed with a hands-on, small-group activity. Here are the topics:

- Take a Fresh Look at Your Relationship with Technology
- Think of Technology as Problem Solving and Processes, Not as Buttons and Boxes
- Design an Intranet—A Safe, Secure Place for Students to Publish Web Pages Without Ever Going Online
- Learn Processes Quickly and Write Them Down as Recipes to Enable Fellow Students
- Use Available Technology to Do Research and Share It With Your Classmates

Feel free to copy these activities and use them in your own workshops. We know you can do better. They encourage teachers to work actively in teams and to look at technology in fresh and original ways. Slightly modified, they will also work with students of all ages. But remember, they're merely examples of the kinds of activities you can design yourself.

The following are typical workshop questions:

- What is the typical role of technology in the classroom? Are teachers, administrators, and parents intimidated by technology? Are they scared to cable anything or touch the computers because they might break them, seem ignorant, or be called a "techie geek"?
- What is your personal relationship with different media tools? Are you more comfortable with paper than with adapters and disk drives?
- Is technology commonly perceived as the domain of "those AV people" or computer classes, or is it considered simply a tool like any pen, pencil, or drawing board?
- What are some of the myths you have heard about technology in the classroom? Do you feel warm and fuzzy or cranky and dyspeptic about technological tools?

In the past, paper had a lot of power. Today, technology has a lot of symbolic power: It is itself more an "icon" than the insignificant wires, cables, and chips that actually make up much of technology. Our challenge now is to demystify technology and examine different attitudes and approaches toward it in the classroom.

*What's the Point?* This activity may seem silly at first, but it does have a purpose. First, it helps participants become comfortable with one another. Next, it helps them rethink their relationships with technology. Cables, CD-ROMs, Zip

drives, and other forms of hardware can often be intimidating. Many people leave it to "techies" to do cabling and wiring. This activity emphasizes that the participants have as much control of the hardware as they have



of their scissors, markers, and paper. It also illustrates our approach to media in the classroom: Construction paper, pens, and books will never be obsolete in the classroom, and a truly multimedia environment will incorporate all tools that facilitate learning, from paper to CD-ROM recorders.



**Activity No. 1** continued...**Break Out of Paper Training!**

**Goal:** Be as creative with cables as you are with paper.

**Description:** Form a group of two or three people. Your assignment is to make something using materials you are given or find around the room. You will have 20 minutes to come up with your construction and build it. Each group will then present its "thing" to the other teams.

**Location:** Classroom

**Materials:** We have supplied high-, medium-, and low-tech supplies, including cables, construction paper, butcher paper, Ethernet cables, PCMCIA cards, scissors, markers, tape, adapters, batteries, portable CD players, flashlights, and CD-ROMs. Anything else you find in the room or have brought with you is fair game.

**Notes:** As your team dreams up how to meet the assignment with these tools, think about your relationship to each type of medium you pick up.

**Activity No. 2** Think of Technology as Problem Solving and Processes, Not as Buttons and Boxes

Ask teachers to imagine they are strand-ed on a deserted island and must create a shelter. Use these rules:

1. The shelter must fit at least two people.
2. You must scavenge all materials.
3. At least *one* item must be scavenged from outside the classroom.

Have the teachers talk about their creations. Brainstorm strategies for scavenging multimedia in their schools and communities. In our workshop, for example, the teachers demolished and rearranged the classroom in 15 minutes. Half of the workshop's participants sat underneath tables, grinning proudly about what they had accomplished.

We raised the following issues in our discussion:

1. How does this activity relate to the "shoestring" approach to multimedia?
2. Do you think technology's cost has significantly slowed its implementation in schools?
3. Where could you go in your community for "scavenged" resources? Who could you ask?
4. Do you feel "the cult of the new" inhibits schools from implementing technology on a large scale because of the argument that "everything we buy will be outdated and useless in six months"?

**What's the Point?** Scavenged multimedia and creating publishing centers on a shoestring doesn't require Pentium II's loaded with the latest version of Windows, Photoshop, and HyperStudio. Even if you think you have nothing, you may still be able to make your multimedia ideas happen by finding materials in your community and buying inexpensive basics.

*Resourcefulness* is the key quality that educators must exhibit and instill in their pupils. Just like MacGyver, who can get out of any tricky situation with just the materials around him, educators can think creatively and accomplish



things without being limited by their district budgets.

So, making a shelter doesn't seem feasible and may even seem silly, right? Well, just watch how people working together can come up with unconventional but completely successful projects by thinking beyond their usual boundaries.

## Activity No. 3 Design an Intranet—A Safe Place for Students to Publish Web Pages Without Going Online

Start by asking the teacher teams to brainstorm 10 possible intranet uses. Then have each team pick the best of its uses for a Pictionary-style game in which other groups try to figure it out. Consider giving prizes to teachers who guess correctly (we gave educational CD-ROMs).

The teachers in our workshop discussed how all of the ideas might work in their own schools and districts. They also talked about the benefits and drawbacks of intranets, how student publishing on an intranet might be better or worse than other computer-publishing projects, and the authentic nature of intranet publishing.

**What's the Point?** Now that teachers have had their fill of making weird things out of paper and cables and building shelters, they should be in a creative state of mind and able to make interesting and innovative suggestions for using an intranet. This activity is designed specifically to generate ideas and discussion among colleagues.

### Intranets Are Everywhere!

**Goal:** Visualize how Intranets can support student writing, collaboration, and creativity.

**Description:** Form a team of two or three people. Brainstorm 10 different uses for an intranet in your community, family, school district, or classroom. Write these uses on a sheet of butcher paper and hang it on the wall the next day. As a team, choose the best idea and figure out how to communicate it to the other teams visually. After all teams have listed their ideas and picked the best, we'll play a Pictionary-style game. Your team will draw a picture of its best intranet idea while the other teams guess. Finally, all of the teams will present their ideas to the rest of the group. Discuss how your team came up with its ideas and which ideas are the most feasible. We'll discuss the ideas and compare ideas across teams.

**Location:** The presentations have to be given in the classroom, but the brainstorming sessions can take place anywhere.

**Materials:** Butcher paper and markers



### Can You Think Like MacGyver?

**Goal:** Learn how to make something out of nothing.

**Description:** Form a team of two or three people. Imagine you are stranded on a deserted island and need to build a shelter. All you have are the materials at hand.

These are the rules:

1. Your shelter must be able to hold at least two people.
2. You must scavenge all of your materials (in other words, we're not providing each team with a pup tent).
3. At least *one* item must be scavenged from outside our classroom.

**Location:** Classroom and surrounding hallways and lobbies

**Materials:** Find your own.



## Activity No. 4 Learn Processes Quickly and Write Them Down as Recipes to Enable Fellow Students

Give each team an assignment, such as finding the nearest local convenience store. When the team completes the assignment, its members should create a brief, easy-to-follow recipe for the other teams. Teams should then exchange and follow recipes. If any part of a recipe is hard to follow, then team members should seek clarification from the recipe's authors. After this process, the participants will have proven recipes that anyone could follow.

We asked participants to find various places in the local community, but you could give them any type of assignment, as long as it can be completed in a short time and broken down into steps that can be followed. Our teams had to leave the classroom to complete their assignments, but you may want to plan assignments that can be completed in the classroom.

Participants raised a lot of questions for discussion, such as the following:

1. How would you characterize the traditional student-teacher relationship? What effect does technology have on this relationship? Do you think this relationship should evolve as technology use becomes more important? How? Why?
2. Can you think of classroom examples in which one student or one teacher becomes a "guru" of technology? Is this healthy? Can such a development become an excuse for others to avoid responsibility for learning by placing it on the shoulders of the classroom "whiz kid," "geek," or "expert"?
3. As a teacher, how do you envision striking a balance between leading your classroom and learning from your students?

**What's the Point?** We have to accept that we will never master everything there is to know about technology. What we can do is provide maps of where we have been and what we learned while traveling there. For example, a teacher who has wrestled extensively with the issues and logistics of capturing audio can be a fantastic resource for beginners who want to capture their first sounds.

By making a map, recipe, or guide, educators can facilitate the sharing of knowledge and debunk the belief that things are so complex that it's impossible to know where to begin. Teachers (or even students) can use the same steps to make a recipe to find a local landmark in their community as well as find their way around a multimedia classroom. And without good recipes and good maps, both efforts to find their way can be utterly confusing and frustrating.

An efficient multimedia classroom will require individuals not only to learn technology and classroom management skills, but also to document their learning process and communicate their knowledge to others by providing recipes for current and future reference.

### One-Minute Gurus

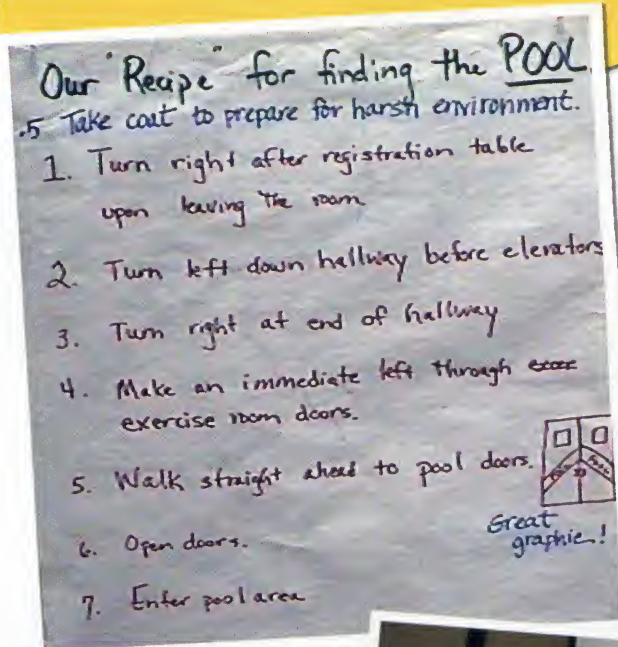
**Goal:** Learn to quickly master and map out a new task and then teach this skill to your students.

**Description:** Form a team of two or three people. You will be assigned a domain of knowledge. Your team members will work together to become one-minute gurus of this domain of knowledge: in this case, finding your way around the local community. Go out and find the location you are given, then create a short list of instructions, or recipe, that anyone else could easily use to find the same place. Come back to the classroom and trade recipes with another group. Test the other group's recipe. If anything is unclear, collaborate with the authors to ensure that every part of the recipe is correct and easy to follow. Finally, each recipe will be posted on butcher paper in the classroom.

**Location:** Classroom and everywhere else

**Materials:** Butcher paper and markers

**Notes:** Your students can use recipes to train their peers. Think about ways to make this model work in your classroom.



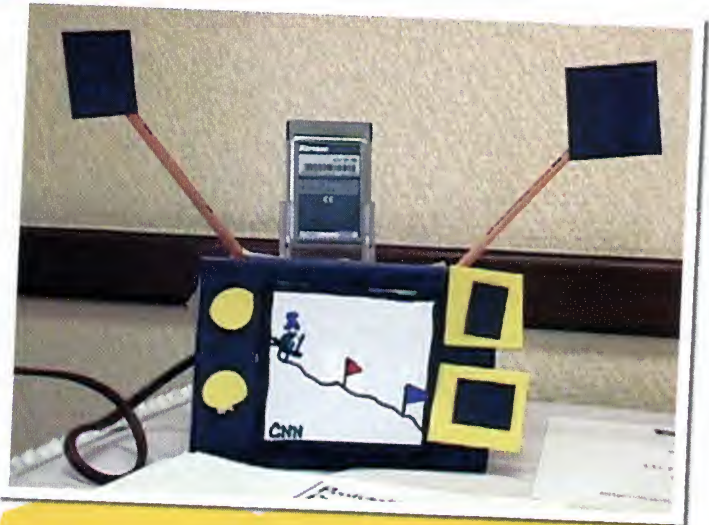
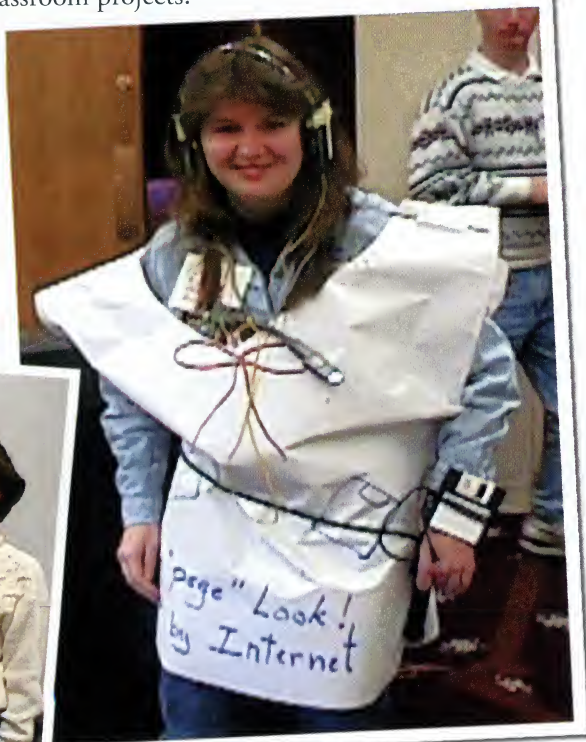
## Activity No. 5 Use Available Technology to Do Research and Share It with Your Classmates

Send teams out into the field to interview people on topics of their choice. The teams can interview anyone: a teammate, a member of another team, a passerby, even an inanimate object. Give the teams portable tape recorders to use during their interviews. The teams will then decide how to use the recorded material in a classroom project. Finally, they will play their interviews for the class and present their project ideas.

After the teams have all presented their information, ask the larger group these questions:

- How can primary research be used in classroom projects? What are the benefits and drawbacks for students who conduct their own primary research?
- Do you see specific advantages or drawbacks to primary research as opposed to the use of secondary information sources such as textbooks and encyclopedias?
- How can multimedia tools be used to conduct research using primary sources?
- How can the Internet be used to conduct primary-source research?
- Do you see any connections between the concept of storytelling and conducting primary research? Who is the main storyteller in a traditional classroom?

**What's the Point?** It's simple: The activity is designed to whet your appetite for primary research and start you thinking about how it can be incorporated in student or classroom projects.



### Eyewitness Reporters

**Goal:** Do primary research

**Description:** Form a team of two or three people. You will be given a tape recorder to use to interview someone about a topic of interest to you. (*Note:* You may have to share tape recorders. Please be generous with other teams.) It doesn't matter who you interview or what your interview topic is. Interview as a group; all team members should ask questions. Limit yourselves to 4 minutes of audio. Then, as a group, brainstorm how this audio information could be used in a classroom project. Finally, everyone will reconvene, and each group will present its interview footage and project ideas.

**Location:** Presentations will be given in the classroom, but your interviews can take place anywhere.

**Materials:** Cassette recorders, pens, and paper

### Conclusion

A great multimedia presentation doesn't have to involve a computer. Create activities to remind teachers that a computer is just one more tool to use with their students—just like paper, pencils, chalkboards, and overhead projectors.

For more information about low-technology multimedia workshops, visit our Web site ([www.mudpie.org](http://www.mudpie.org)).

Fred D'Ignazio, [dignazio@msen.com](mailto:dignazio@msen.com);

Catie D'Ignazio, [catiedig@ix.netcom.com](mailto:catiedig@ix.netcom.com)

# Young Authors

at Home  
on the  
Web



**At our summer camp, as soon as our students learned a skill, they passed it on to other students, who, in turn, taught others.**

**T**he world is a multimedia, multi-sensory environment, filled with beautiful pictures, smells, sounds, tastes and textures. In the past as students explored this world, their "publishing" efforts were limited to the teacher's folder or the refrigerator in their family's kitchen. Today, the Internet offers a virtual multimedia environment, which, when coupled with multimedia authoring tools, offers an opportunity for students to conduct research and share it via home pages with other students all over the world. The Internet vastly extends the audience for student multimedia publishing (see Figures 1-2).

#### **EYEWITNESS RESEARCH**

While students love to do research on the computer, computer-based research should not entirely replace real-world eyewitness research. Plants, animals, scenery, and other people in the community can be a source of rich images, sounds, and stories for students to collect and paste into their reports using a multimedia authoring tool. Students can also create audio links on their home pages that play back small voice files, documenting observations they have made. Or, they can create audio captions that accompany written text or pictures in their report. To tie together all

their multimedia research, there are a variety of home page authoring programs on the market for K-12 use, including Adobe PageMill, Claris Home Page, Microsoft FrontPage, Webster from Washington Computer Services, and Sunburst Web Workshop.

This article is based on two years of training students and teachers to create home pages on the World Wide Web and on an intense summer camp on Web page authoring, conducted at Okemos High School in central Michigan. In the summer camp, we used Claris Home Page on Macintosh and IBM computers as our primary authoring tool. Our students ranged from 3rd graders through college students. The students' work is on display at <http://www.tcimet.net/mmclass/summer/CHPTales.htm>.

#### **"EACH ONE, TEACH ONE"**

At our summer camp, as soon as our students learned a skill, they passed it on to other students, who, in turn, taught others. The "each one, teach one" philosophy can be implemented to expand new skills quickly among your students. Using this model for a recent home page project, we broke our multimedia tasks into areas of expertise. Each student became our "resident expert" regarding one topic. Their knowledge grew out of

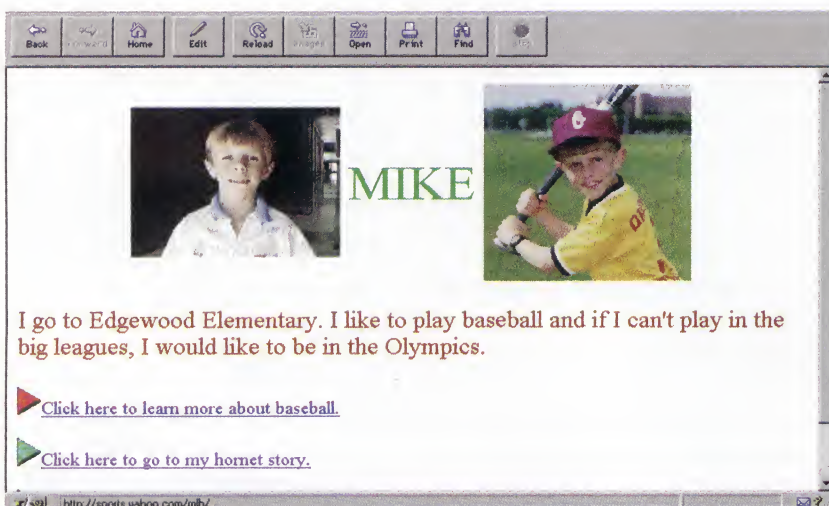
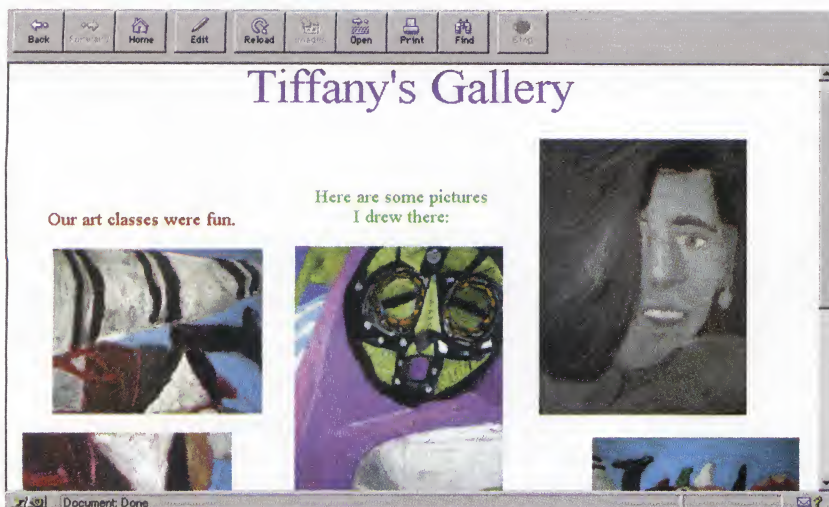
their interest in the hardware, which would help them display their talents on the Web. Thus, our crew divided along the following lines:

- ◆ Sound Recording Expert
- ◆ Scanner Expert
- ◆ Graphic Artist
- ◆ Photo Reader Expert
- ◆ File Format Magician
- ◆ Digital Photographer
- ◆ Quick Cam Expert
- ◆ Internet Link Explorer
- ◆ File Transfer Technician



**Never underestimate  
student ingenuity.**

## Figures 1 & 2



*Web publishing expands children's opportunity for self-expression, well beyond the refrigerator door!*

These students received on-the-job training with quick, one-to-one bursts between teacher and student, and they loved the recognition they received as an "expert" in their field. Once trained, their names were added to the classroom "experts poster" advertising their skills, and their knowledge helped them train the next student who was ready to add that special feature to his or her own home page.

Your own group can be divided according to the multimedia tools you have on hand. This list needn't be all-

inclusive. If you have a laserdisc player, an interface box between TV and computer, or any other multimedia tool, invent a new "expert." Never underestimate student ingenuity. Our sound technician had a single microphone on a computer and a boom box. Sounds were made and recorded using human voice, musical instruments, and classroom objects. Testing to locate an object which would make just the right sound, recording it, cropping the portion needed, and overlaying sound files were all part of the process.

## Showcasing Skills

Students made frequent presentations to the entire class, demonstrating new skills they had acquired. As comfort levels increased, some were asked to make group presentations. These consisted of "how-to" demonstrations, with student presenters repeating the steps they had used to create their own home pages. Even the youngest members of our crew felt confident showcasing their skills. A case in point was our sound technician, an active 3rd grader who got up in front of the room, demonstrated his home page on a large-screen TV, and lectured to a room full of adults. It was impressive watching high school students and a college student take notes!

This shared respect was typical of the experience we had with home page authoring. It enabled students of all grades to create attractive work, which generated a lot of pride of authorship and respect among fellow authors. It was remarkable to have this professional air in a room in which the grades and ages of the students varied so widely.

A quick student/teacher show-and-tell during the latter part of each work session was a great way for us to tap into progress and make suggestions for the next session. Conference notes such as those used in other curricular areas help teachers to communicate. A simple multimedia form highlighting the areas of next concentration or a simple "See me next session for a great idea" opens dialog about the project and shares your enthusiasm.

**This shared respect was typical of the experience we had with home page authoring.**

## MULTIMEDIA DETECTIVES

Teachers can organize their students into research teams of "multimedia detectives." Students play the role of detectives in curriculum content areas and in troubleshooting technology tools. The detectives can sign a contract like the sample contract shown in the adjacent sidebar.

### Assembling Materials

You will need a multimedia computer, an authoring program such as Claris Home Page, an Internet connection, blank tapes and diskettes, assorted cables and adapters, etc. With this basic equipment, once your students have been organized into detective teams, you can get them to become "scavengers" and look for additional key items which will form part of your "R-A-P" center, a multimedia Research, Authoring, and Publishing center for creating Internet home pages. Video cameras, tape recorders, pocket cameras, and other low-cost consumer electronic products found around any home or classroom can be repurposed into research tools, which students can use to create original images and sounds for their home pages. See the sidebar on page 27 for a listing of typical hardware and software tools that you might consider if you could outfit your center without regard to cost. For a complete "R-A-P" checklist, consult our Web site at <http://www.ticmet.net/mmclass/course/toc.htm>. Here you will find a number of lists of additional resources that will be helpful to you. We give you permission to reproduce everything you find on this site.

### Web Page Authoring

We chose to use Claris Home Page for our summer camp for two reasons. It runs on practically all Macintosh computers and on PC computers running Windows 95. It is a simple program that resembles a word processor. Students can quickly create a home page

## Sample Student Contract

### STUDENT DETECTIVE TEAMS

I \_\_\_\_\_ (name) will work with my fellow students to help my teacher:

1. Scout out, locate, and assemble new technology tools for use in classroom research, authoring, and publishing.
2. Manage and operate all equipment safely, fairly, and politely.
3. Troubleshoot, solve problems, and figure out how to use our equipment for research, authoring, and publishing.

I will share responsibility with other students for conducting demonstrations and tutorials which help others learn to do useful tasks with the equipment.

I will divide my time equally between learning the new technologies for myself and sharing what I know with others, including classmates, teachers, and parents.

I understand that my teacher can't figure out new technology alone. My teacher needs the help of every student in the class to:

1. Scout out the best technology
2. Bring it into the room
3. Set it up and make it work
4. Teach others how it works
5. Manage projects so everyone in the room (including the teacher!) gets experience working with the technology to do research and publishing.

As a result, I understand that if students do not cooperate and help our teacher with technology, then he/she will be forced to minimize the use of technology in our classroom (just to keep on schedule and remain sane).

As a technology helper and coach, I will try to remember what it feels like to be a new learner in an unfamiliar area. I will be polite and use kind words to encourage others to take their first steps into technology. And I will try to keep on schedule in all my personal projects and team projects.

Last, I will remember that my grade is less dependent on my being a technical whiz kid and more on my being a good teacher, friend, and helper.

Student's Signature

Date

Teacher's Signature

(Please get your students to take the contract home and have their parents co-sign it.)

# Tools for Creating Multimedia Web Pages

## AUTHORING SOFTWARE

### Claris Home Page

Claris, Inc.  
5201 Patrick Henry Drive  
Santa Clara, CA 95052-8168  
800/356-6657;  
<http://www.claris.com>  
(Mac/Win95)

### Adobe PageMill

Adobe Systems  
P.O. Box 1034  
Buffalo, NY 14240-1034  
800/411-8657;  
<http://www.adobe.com>  
(Mac/Windows)

### FrontPage

Microsoft Corporation  
1 Microsoft Way  
Redmond, WA 98052  
800/426-9400;  
<http://www.microsoft.com/>  
(Mac/Windows)

### Webster

Washington Computer Services  
2601 North Shore Road  
Bellingham, WA 98226  
360/734-8248;  
<http://www.nas.com/~larryk>  
(Windows only)

### Web Workshop

Sunburst Communications, Inc.  
101 Castleton Street  
Pleasantville, NY 10570-3498  
800/321-7511;  
<http://www.nysunburst.com/>  
(Mac/Windows)

## VIDEO CAPTURE

### VideoVision

Radius Inc.  
215 Moffett Park Drive  
Sunnyvale, CA 94089-1374  
408/541-6100;  
<http://www.radius.com/>  
(Mac only)

### LPT Video

Digital Vision Inc.  
270 Bridge St.  
Dedham, MA 02026  
800/346-0090;  
<http://www.digvis.com/>  
(PC only)

### Snappy

Play, Inc.  
2890 Kilgore Road  
Rancho Cordova, CA 95670  
916/851-0800;  
<http://www.play.com/>  
(PC only)

## DIGITAL CAMERAS

### QV-10A

Casio, Inc.  
570 Mt. Pleasant Avenue  
Dover, NJ 07801  
800-962-2746;  
<http://www.casio-usa.com/>  
(Mac/PC)

### QuickCam

Connectix  
2600 Campus Drive  
San Mateo, CA 94403  
800/950-5880;  
<http://www.connectix.com/>  
(Mac/PC)

## PHOTO SCANNER

### EZPhoto

Storm Software  
1861 Landings Drive  
Mountain View, CA 94043  
800/275-5734;  
<http://www.stormsoft.com/>  
(Mac/PC)

## PORTABLE DISK STORAGE

### Zip Drive

Iomega Corp.  
1821 West 4000 South  
Roy, UT 84067  
800/697-8833;  
<http://www.iomega.com/>  
(Mac/PC)

## VIDEO PUBLISH/PROJECTION

### TelevEyes

Digital Vision  
270 Bridge St.  
Dedham, MA 02026  
Dedham, MA 02026  
800/346-0090;  
<http://www.digvis.com/>  
(Mac/PC to TV or VCR)

either by copying and pasting text created in their classroom word processor or by typing text directly into Claris Home Page. They never see any messy computer code. Their home pages look approximately the same as what they will look like when loaded on an Internet server.

## Students can publish their home pages on a school's protected Intranet.

For example, when your students save their "word processing" file they are automatically saved in HTML (HyperText Mark-up Language) format, which is readable by any Web browser (including Netscape Navigator and Microsoft Internet Explorer). You and your students can also use Claris Home Page to open any existing HTML page and edit it or modify it. Almost all the activities you do to create a home page appear as buttons in a menu at the top of a Claris Home Page screen. For example, you can add "links," which will lead you to another home page. You can add links that will lead to another type of a file, such as a sound or movie clip. You can insert images and tables, and of course, you can edit all of the above. Now student research can be expanded far beyond simple words on paper.

## A Secure Environment

For teachers who are worried about students being at risk if they publish on the Internet, there is an alternative. Students can publish their home pages on a school's protected Intranet—a secure, wide-area network, which spans the school buildings in a district, or a local-area network right inside a single school. Even more protection is offered if the students publish only in their own classroom and their home pages are stored on the classroom computer's



Mike, a 3rd grader, prepares to author a Web page using Claris Home Page.



As soon as our students learned a skill, they passed it on to other students, who, in turn, taught others.



In this picture Jennifer, a middle-school student, demonstrates the Quick Cam "eyeball" camera, which records still images and short digital movies.



Kevin, our high school student, tutors a fellow student in how to use the Casio QV-10A digital camera.



Students made frequent presentations to the entire class, demonstrating new skills they had acquired using hardware and software.

hard drive. Or, for the greatest security, students can save their home pages only on their own private student diskette or zip disk.

This form of protected publishing doesn't compromise students in the least. Students can demonstrate their work in front of others, even if their home page resides on a single floppy disk. They can print their work to turn in to the teacher or to share at home with their parents. They can even copy their files to other students' disks and share home pages the way past generations of students traded baseball cards.

## TEACHING IN A MULTIMEDIA WORLD

As our multimedia world expands on the Internet, the teacher's role must become that of guide on-the-side, not sage on-the-stage. An individual teacher—or even a team of teachers—can no longer encapsulate a subject area to be studied and direct the students through the information at hand. Up-to-the-minute information in all subjects is the emerging standard for classroom learning. As educators, our emphasis must be to place the vehicles to seek out current knowledge within easy reach of our students. Preparing your class to author home pages on the Web will capture your students' curiosity and propel them into this new multimedia world.

**Fred D'Ignazio** is the author of 25 science and technology books for children. Fred's most recent project is a CD-ROM entitled M.U.D. Pie—Multimedia U Design. It's As Easy As Pie, which helps classrooms begin publishing home pages on the Internet. **Joanne Davis** has 24 years experience teaching elementary and middle school. Communications to the authors should be addressed to Fred D'Ignazio, President, Multi-Media Classrooms, Inc. 1773 Walnut Heights Drive, East Lansing, MI 48823-2945; 517/332-8896; e-mail: [dignazio@msen.com](mailto:dignazio@msen.com); Joanne Davis, Elementary Computer Coordinator, Okemos Public Schools, 4406 N. Okemos Road, Okemos, MI 48864; 517/349-2093 x2080; e-mail: [jdavis@okemos.k12.mi.us](mailto:jdavis@okemos.k12.mi.us) ✉



Student musicians can create original music and sound effects for home pages using a simple microphone and sound card.



A new generation of small "tiny-tech" research tools lets students play the role of detectives and do eyewitness investigations in the form of news clips, interviews, oral testimonies, photojournalism, etc.

# Back From the Dead

## RESCUING COMPUTERS FROM THE MORGUE

*Just because your school's hardware is old or has "died" doesn't mean you can't put it to good use. Use your imagination and resurrect it as a new piece of equipment.*

By Anna Jordan

A decade or more ago when computers began to appear in classrooms, school administrators spent tech money eagerly. Computers sprouted overnight, like mushrooms, but often ended up sitting in dark storage rooms, covered with dust and surrounded by outdated textbooks, old district mandates, and assorted scopes and sequences. In the current climate of budget restrictions, educators would do well to dig out and dust off this still-useful technology and put it back to work.

Let me relate a true story of just such a technological resurrection. . . .

I work with an innovative team of teachers in a bustling middle school, which is probably similar in many ways to the middle schools in your district. Frustrated by continual demands to "do more with less," we decided to reexamine our

technology resources with an eye toward using what we already have more efficiently and effectively.

The harried technology coordinator, overwhelmed with other urgent responsibilities, gladly led me to The Room. His key turned slowly in the lock and the door creaked open to reveal The Computer Morgue. As my eyes grew accustomed to the light, I saw them—the outcasts, the rejects, the discards—sitting expectantly. No one had visited in quite a while. The countertops were lined with gap-toothed keyboards and CPUs with frayed cables dangling lifelessly to the floor. Monitors miss-

ing knobs wobbled when touched, having lost at least one rubber foot. Disk drives huddled together in a cardboard box, some with disks still entombed within. My creative juices began to flow. "There's hope in this room," I thought, "real possibilities."

I took a deep breath and rolled up my sleeves. It was clear what I had to do.

I experimented as lovingly as Dr. Frankenstein might have. To my surprise, the first monitor I plugged in lit up immediately, winking only once or twice as it regained use of its faculties. "Step One," I said to myself.

But my beginner's luck didn't hold out. The first four CPUs failed to respond to the electrical energy I vainly pumped through their veins. Finally, the fifth one blinked to life. "Ah, Step Two," I whispered.

I sifted through the box of disk drives trying to divine a likely prospect. I settled on the one with "LOVE" scratched into its side. It was a good omen, I decided. I popped off the cover of the fifth CPU and wiggled the disk cable into position. With the flick of a switch, my technological mutant stuttered back to life. Slowly the words "Grammar Review" came into focus on the green screen. Amazing! Step Three had been accomplished. I now had a complete creation upon which to test my odd assortment of mutant parts.

The afternoon sped by as I tested each component, rejoicing when one worked, swearing when another didn't. The discard



pile grew, but so did the stack of working components. At day's end I proudly surveyed the fruits of my labor—mutant creations worthy of a part in the Disney movie *Toy Story*. Eight living, blinking computers sat before me ready to be distributed to eager teachers.

As my story illustrates, “high tech” is a relative concept. I encourage teachers who want to use computers in the classroom but who have no tech funds: search for The Computer Morgues in your schools. Look under the dust covers in the storerooms, and ask colleagues who may not be using their computers if you may “borrow” theirs. A little creativity and a bit of tolerance for odd-looking computers is all you need to take your next technological step. ■

Anna Jordan, Swift Creek Middle School, 2100 Pedrick Road, Tallahassee, FL 32311; [jordana1.mail.firn.edu](mailto:jordana1.mail.firn.edu)

Fred D'Ignazio edits *Multimedia Sandbox*. Fred can be reached at *Classrooms Without Walls™*, Multi-Media Classrooms, Inc., 1773 Walnut Heights Drive, East Lansing, MI 48823-2945; 517/332-8896; fax; 517/332-9378; [dignazio@msen.com](mailto:dignazio@msen.com); <http://www.tcimet.net/mmclass/>.

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541/302-3777 (International)



## The Frankenstein Connection

As the editor and regular author of this column I couldn't resist asking Anna Jordan to describe her experiences as a project manager for a technology-in-education project for this month's column. I had been having dinner with Anna and her teaching colleague Winky one night during the recent Florida Education Technology Conference in Orlando. Both women are exemplary teachers who work for the nationally renowned instructional program Project CHILD (Computing Helping Instruction and Learning Development). Both women have a daunting caseload of schools that they regularly visit as technology consultants. Anna had been telling me the funny story of how she felt like Dr. Frankenstein when she recently visited one of her schools and assembled miscellaneous computer “body parts” into a single working computer. The image was wonderful! I could just see Anna all dressed up in a white lab coat, cackling like a mad Gene Wilder character, pulling the final switch. As the electricity coursed throughout the little computer, its screen blinked on, and Anna, her hair frizzed out from the electricity, cried gleefully, “Eeet's alive! Eeet's alive!”

Her story as reported here is short and educational, almost like a fable. And like a fable it has a simple but powerful moral: We are caught in a race for new technology. As we buy more and more boxes, we devalue and discard boxes we already have. Although the technology may be only a few years old (some of it anyway!), we reject it as obsolete technology—as shabby, almost embarrassing “state of the past.” Don't get me wrong. It's good to try to keep on the cutting edge, but I sometimes wonder if we haven't lost our common sense. I visit school after school where technology administrators are in too big a hurry to adopt the “new.” Just when teachers are getting comfortable with the “old,” they are told it is out of date and, therefore, no good.

Anna's fable is funny and neat. And it contains a really great idea. There is probably more than one useful, functioning machine lurking among all that old techno-junk scattered around your school. It would be a great project for you or your students to become Dr. Frankensteins, just like Anna, and bring these machines back to life. Students could work with their teachers to figure out good tasks for the machines. If we did this for a while, we'd save money and get more mileage out of the technology we already have and know how to use. Our “throwaway” technology culture would benefit from a little recycling.

—Fred D'Ignazio



# Students As One-Minute Gurus

## A ONE-YEAR RECIPE FOR TECHNOLOGY BEGINNERS

In last month's column, I discussed a new path teachers can take toward creating student-centered, technology-based environments for teaching important skills. This month, I will describe the recipe for reaching that goal. The ideas in this column are derived from a telecourse I taught for Florida educators that combined FIRN (the Florida Information Resources Network), the Internet, and the Florida distance-learning satellite. The course was facilitated online by Gopher Bill (teacher Bill Jordan) and featured the 1993–94 U.S. Teacher of the Year Tracey Bailey as cohost. The course was cosponsored by the University of Central Florida and the Florida Department of Education. More than 3,000 teachers attended the course along with students, parents, and community members.

### The Publishing Wheel

The secret behind the course's success is that it is honest. The glitz and glamour of some schools' technology showcases is unreal and difficult to duplicate. Most teachers are strapped with limited resources, no time, no money, minimal training, and little self-confidence when working with technology. The goal of this course is to let teachers create rich technology experiences for students even when the teachers are beginners with scarce resources. Students work as "Glitch-Busters" and "Nintendo Commandos" to help their teachers cope with new technologies as these technologies flow into the classroom.

Teachers and their students create a "publishing wheel" of minicenters, which ring the classroom or media center. Student teams locate materials for the centers, construct the centers, create tutorials, and train each other. The centers are special because they are dynamic. They reflect the actual resources in a classroom, school, or community; and they change constantly as new resources are uncovered. Students are the active agents in the entire process and take all responsibility for the success or failure of the process.

The course's title, the One-Minute Guru, comes from the change in thinking needed to convert today's teacher-guru-centered classroom into a classroom with many student guru. A proven way to accelerate classroom learning is to recognize that a single guru cannot process and communicate new knowledge fast enough. However, classrooms can accelerate learning if the teacher nurtures her students to become a network of gurus, each helping the classroom learn. The goal is to weave a classroom "web"—a human web of cooperating minds, spirits, and imaginations. In a one-minute guru (OMG) classroom, everyone can be a guru, and each person can make a contribution to another person's learning. This has been the "talk" of education for some time, but this talk has

been mostly empty. Now it is time to "walk the walk."

In an OMG classroom, common notions of technology are turned upside down. Technology is not seen as a solution but as a fertile source of problems. Technology becomes a challenging, constantly changing habitat; and students exercise their ingenuity to cope with the flood of problems that technology creates. The emphasis in an OMG classroom is on imagination and innovation, not simply on accumulation.

### A One-Year Plan

The entire process of creating student publishing centers and transforming your students into OMGs takes about a year. Here is a summary of the steps needed to complete this transformation.

**Step One: Organize Student Teams.** Teachers meet with their students to create a student contract (Figure 1), giving students responsibility for the success of this new enterprise. Students form Writing Teams. Teachers form partnerships with students and jointly create specific minicenters using items from checklists like the one shown in Figure 2. These checklists can be generated after students have identified available items in a Scavenger's Inventory (Figure 3) of on-hand technology in the classroom, school building, and home. Other more detailed checklists like the one shown in Figure 4 can also be developed.

**Step Two: Scavenge Technology Leftovers.** Teachers and students search their rooms, buildings, and homes for technology leftovers to create a "multimedia potluck." Student teams match items with a list of ingredients for creating publishing minicenters, construct their own centers, and document the construction with photos, drawings, and construction recipes. They develop a sample publishing application using their minicenters. Last, they contribute to a classroom cookbook composed of recipes that they test on their fellow students, teacher, and parents. Student teams take total responsibility for the minicenters.

**Step Three: Create Point-and-Click Portfolios.** The students use some of the new point-and-click media (e.g., camcorders, laserdisc players, CD-ROMs, digital cameras, scanners, zappers) to begin publishing student portfolios. They write recipes for their cookbook that describe how to use the new center for making the portfolios. Teachers form partnerships with their media specialist to organize a multimedia club in the media center to expose other teachers and students to this strategy. The club's goal is not to show off what the club members can do but to create a cadre of student consultants, coaches, and teacher apprentices who can

fan out in the school building to help teachers in their classrooms.

**Step Four: Create a Digital Publishing Station.** Teachers and students convert scavenged minicenters into feeder stations for a digital publishing center. Students create an inexpensive, low-tech digital center; later, when and if money is available, they can create a more expensive, high-tech station. The digital stations become the hub of the publishing wheel of classroom minicenters that lie around the rim of the room. Students use the station to continue developing their portfolio anchor pages. They write recipes (Figure 5) for the new station and publish them in the classroom cookbook. Students reach out beyond the classroom to gather research for their portfolios.

**Step Five: Go Online.** Teachers and students move from a stand-alone digital publishing station to an online telecommunicating station. With the addition of some equipment and software, the classroom station acts as an online vehicle for students and teachers to ride on the global information superhighway. Students and teachers scavenge a modem, install a phone line in the classroom (or media center), get an online account, and acquire modem software for their computer. By partnering with parents and other community members, they find a way to use a local bulletin board service to communicate with local experts and other classrooms in their own community. Students continue writing recipes for their cookbooks and attempt to use their online research to enrich their portfolios. They publish some of their writing as "online talk shows" and as e-mail to other students.

To complete Step Five, students and teachers review the basic three processes of the OMG strategy—innovation, partnering, and publishing. They should see how they can constantly renew these processes by incorporating new technologies as they become available.

#### Until Next Time ...

Next month's column will include more sample recipes for student publishing applications using the minicenters. ■

[Fred D'Ignazio, *Multi-Media Classrooms, Inc.*, 4121 Okemos Road, Suite 24, Okemos, MI 48864; [dignazio@msen.com](mailto:dignazio@msen.com)]

#### Online Resources

Fred's "OMG" Course is available for download to disk at <http://www.tcimet.net/mmclass/omg.htm>

The Student Contract: <http://www.tcimet.net/mmclass/course/smrgstw1.htm>

Multimedia Inventory: <http://www.tcimet.net/mmclass/course/smrgstw2.htm>

Minicenter Checklist: <http://www.tcimet.net/mmclass/course/potlstw1.htm>

Low-Tech Digital Publishing Center: <http://www.tcimet.net/mmclass/course/mrapstw1.htm>

Multimedia Workstation Starter Kit: <http://www.tcimet.net/mmclass/course/mrapstw2.htm>

*Note:* The text in the figures in this month's column and the World Wide Web pages at the addresses given in the Online Resources section are copyright © 1994 Multi-Media Classrooms, Inc.

#### Sample Student Contract for Student Writing Teams

I \_\_\_\_\_ (name) will work with my fellow students to help my teacher:

1. Scout out, locate, and assemble new technologies for use in our classroom.
2. Manage and operate all equipment safely, fairly, and politely.
3. Troubleshoot, solve problems, and figure out how to use our equipment for learning, teaching, and authoring.

I will share responsibility with other students for writing up simple guides ("recipes") that help others learn to do useful tasks with the equipment.

I will divide my time equally between learning the new technologies for myself and sharing what I know with others (classmates, teachers, and parents).

I understand that my teacher can't figure out new technology alone. My teacher needs the help of every student in the class to:

1. Scout out the best technology.
2. Bring it into the room.
3. Set it up and make it work.
4. Teach others how it works.
5. Manage projects so everyone in the room (including the teacher!) gets experience working with the technology to do useful and cool things.

As a result, I understand that if I do not cooperate and help my teacher with technology, the use of technology in our classroom will be minimized because we must keep on schedule and maintain our sanity.

As a technology helper and coach, I will try to remember what it feels like to be a new learner in an unfamiliar area. I will be polite and use kind words to encourage others to take their first steps into technology. And I will try to keep on schedule in all my personal and team projects.

Last, I will remember that my grade is less dependent on my being a technical whizkid and more on my being a good teacher, friend, and helper.

\_\_\_\_\_  
Student's Signature, Date

\_\_\_\_\_  
Teacher's Signature, Date

\_\_\_\_\_  
Parents' Signatures, Date

(Please have your parents cosign this contract.)

Figure 1. Sample student contract.

## Research—Author—Publish: A Checklist for Planning and Assembling Minicenters

The following checklist is neither mandatory nor exhaustive. It is meant to be suggestive. You and your students should use this list along with your home and school inventory lists and your worksheet entitled "Matching Minicenters to Students' Learning Styles," available on the World Wide Web.

It is up to you to construct customized minicenters that best fit you, your students, and your classroom. Also, don't try to assemble all the centers at once. Ideally, the Phase One of the minicenter process should take anywhere from one month to an entire semester.

Here are some centers you might choose to assemble:

### Audio Center

- Tape Recorder
- Microphone/Headphone
- Blank Tapes
- Optional Background Sounds:
  - Tape Recorder #2 (or CD Player, Boombox, or CD-ROM Player)
  - Sound Effects Tapes (or CDs or CD-ROMs)
  - Small Musical Keyboard
  - Record Player/Records
  - Live Instruments/Live Voices

### Video Center

- Video Camera
- Tripod
- Music Stand (for signs, pets, rocks, fossils, pictures, etc.)
- Masking Tape (for hanging student art work on the wall to use for video graphics and titles)
- Blank Videotapes
- Microphone/Headphones
- Optional Video Backgrounds:
  - Segments taped from CNN NewsRoom
  - Segments taped from other copyright-free cable
  - Educational tapes (Nat'l. Geographic, NOVA, Smithsonian, personal videotapes)

### Writing Center

- Notebooks, Pencils, Pens
- Optional:
  - Word Processing Program
  - Computer
  - Printer
  - Blank Disks

### Graphics Center

- Markers, Crayons, Paints
- Poster Board, Construction Paper
- Optional:
  - Paint or Graphics Program (e.g., *HyperStudio*, *LinkWay*, *Multimedia Scrapbook*, *ClarisWorks*, *KidPix*, *PrintShop Deluxe*, *Creative Artist*)
  - Computer
  - Printer

### Research and Capture Center

- Books, Magazines, Newspapers
- Note Cards, Pens, Pencils
- Optional (Low-Cost):
  - Computer
  - Microphone, Headphones
  - Sound Card (PC only)
  - Music Stand (for propping up objects to be captured)
  - HyperStudio* (Mac/Ilgs), *Multimedia Scrapbook* (Windows), *LinkWay* (DOS)
- Optional (Higher Cost):
  - Cable TV
  - VCR/TV and Educational Tapes

- Laserdisc Player, Laserdiscs
- CD-ROM Player, CD-ROM Clip Images, Sounds, Etc.
- Hand Scanner (e.g., Logitech)
- Digital Camera, e.g., QuickTake (Apple), PhotoMan (Logitech)
- VideoSpigot (SuperMac) or ComputerEyes (Digital Vision)

### Telecommunications Center

- Computer
- Modem and Computer Cable
- Phone Jack to Outside Line
- Phone Cable Between Modem and Jack
- Modem Software (e.g., *ZTerm*, *ProComm*, *ClarisWorks*, *WinTerm*)
- Telecommunications Service and Local Dial-Up Number (e.g., local bulletin board, America Online, Prodigy, CompuServe, Internet provider)

### Computer Layout & Editing Center (Optional)

- HyperStudio* (Mac/Ilgs), *Multimedia Scrapbook* (Windows), *LinkWay* (DOS)
- Optional:
  - Inspiration* (brainstorming, writing, visualizing, outlining software)

### Multimedia Publishing Center

- Computer With Multimedia Program

#### To Publish on Paper:

- Printer, Paper, Cartridges
- Labels and Card Stock for Student Business Cards
- Poster Paper and Construction Paper for Signs and Posters

#### To Publish on Diskette:

- Blank Student Diskettes

#### To Publish on Audio Tape:

- Audio Tape Recorder
- Blank Tapes

#### To Publish on Videotape:

- Video Camera/Tripod (Point camera at computer screen while students narrate script into the camera microphone)

#### Optional:

- Presenter Plus (or TelevEyes) Computer-to-Video Converter
- Cables and Adapters (see "Starter Kit" handout)
- VCR
- TV
- Blank Videotapes (Student "portfolio" tapes or "project" tapes)

#### To Telepublish Over a Network:

- Telecommunications Center (See Telecommunications heading above)
- Software (e.g., *ProComm Plus*) that lets you attach files to e-mail (files might be text files, sound files, image files, video files, and/or hypermedia files, e.g., *HyperStudio*, *MM Scrapbook*, Bulletin Board Databases That Store Your Students' Work)
- Optional:
  - CUSeeMe* Video Conferencing Software (for Mac or PC) on the Internet
  - Mosaic* (NCSA freeware or commercial version multimedia document and document browser software)

### Live Tutorials

Student teams can create exhibits, tutorials, and other material in front of the class. Teachers can tape these presentations and dub the tapes onto the students' portfolios. These tapes create vivid and dramatic evidence of students' evolving skills in oral communication, cooperative learning, and technology.

Figure 2. Multimedia checklist.